

ECOSYSTEM MANAGEMENT

4. AG 8/3: S. HRG. 103-951

ARING

cosystem Management, S. Hrg. 103-95... ORE THE

SUBCOMMITTEE ON

AGRICULTURAL RESEARCH, CONSERVATION,
FORESTRY, AND GENERAL LEGISLATION

OF THE

COMMITTEE ON AGRICULTURE,

NUTRITION, AND FORESTRY

UNITED STATES SENATE

ONE HUNDRED THIRD CONGRESS

SECOND SESSION

ON

ECOSYSTEM MANAGEMENT

APRIL 14, 1994

Printed for the use of the
Committee on Agriculture, Nutrition, and Forestry



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ECOSYSTEM MANAGEMENT

THURSDAY, APRIL 14, 1994

U.S. SENATE,

SUBCOMMITTEE ON AGRICULTURAL RESEARCH,
CONSERVATION, FORESTRY, AND GENERAL LEGISLATION,
COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY,
Washington, DC.

The subcommittee met, pursuant to notice, at 3:02 p.m., in room SR-332, Russell Senate Office Building, Hon. Thomas A. Daschle, Chairman of the subcommittee, presiding.

Present or submitting a statement: Senators Daschle, Craig and Cochran.

Senator CRAIG [presiding]. This hearing will come to order, and I would ask all of those who are witnesses to come up, find your name, and just sit at the table.

Senator Daschle, our Chairman, is running a little late, and he has asked me to go ahead and start this hearing today. In the format that he appreciates, and I do, too, we will have you all seated at the table and ask each one of you to give your thoughts and reflections on the issue, and then we will get you all involved in a *give-and-take* discussion of the questions that we would like to ask.

I especially want to thank the participants for their preparation and their involvement and also to recognize some participants that we have here from Idaho today, from the Potlatch Corporation, Kevin Boling, Bill Wall, and Dennis Murphy.

This ecosystem hearing is the second in a series which will continue through this legislative year. The first hearing we held was November 9, 1993. Its focus was on policy definitions, goals, and coordination between agencies. Various agencies were called upon to describe the ecosystem policies they were developing.

In this second hearing today, we would like to focus on various innovations, grassroots efforts which have begun across the country. These projects have been generated by local and regional problems which have sprung people into action. Most of them started before ecosystem management became a popular concept, but there is much to be learned from them.

We want to hear about the successes and the barriers these projects have encountered to understand how those lessons might bear on national policy for ecosystem management.

Senator Daschle and I have agreed on field hearings in August in South Dakota and in Idaho to gather more information on field applications. Later this fall, a final hearing will be held here to explore real-world implementation, such as the intermixture of public

and private lands and the kinds of problems that we might encounter in this effort.

Eventually, it may be wise to draft legislation that will facilitate moving forward with ecosystem management. I suspect there are barriers such as the species-by-species requirements of the Endangered Species Act which will need to be cleared before ecosystem management can appropriately proceed.

I am cautiously optimistic that ecosystem management may offer an approach which will unify the special interests who are now divided over the management of our public lands. Perhaps we can restore some constant flow of goods and services to stabilize our local communities, while at the same time restoring and maintaining ecosystems which support a diversity of plant and animal life.

One topic I would like the witnesses to address is the relationship of ecosystem management to the very severe forest health problems we are witnessing throughout the Inter-mountain West.

As you know, a combination of insect disease and drought have severely damaged our forests and placed us in danger of more frequent and very disastrous forest fires. A recent report from a group of scientists who studied this problem and met at Sun Valley, Idaho, concluded we only have a narrow window of time to reverse what is apparently a very severe cycle.

How will ecosystem management enable the Forest Service and private timber land owners to address this critical solution?

So, with those thoughts in mind, I would like to begin the hearing. Our first witnesses that we have before us are, of course, the Chief of the Forest Service, Jack Ward Thomas, and Deputy Assistant Secretary of Agriculture for Natural Resources and Environment, Adela Backiel.

So, Chief, if you would start, we would appreciate it.

Ms. BACKIEL. Senator, if you don't mind, I think I will begin—
Senator CRAIG. All right.

Ms. BACKIEL. —primarily because I am going to be introducing our witnesses, and I wanted to just give a very brief overview.

Senator CRAIG. Great.

Ms. BACKIEL. You have a copy of my testimony—

Senator CRAIG. Yes, we do.

Ms. BACKIEL. —and I wanted to give a very brief overview because the reason we are here, really, is to hear about examples, and the people who are here—

Senator CRAIG. Let me have all of you assume that the text of your full statement will become a part of the record.

Ms. BACKIEL. Thank you.

Senator CRAIG. So you may proceed.

[The prepared statements of Senator Craig and Senator Cochran follow, respectively.]

STATEMENT OF SENATOR LARRY E. CRAIG

Senator Daschle will be a few minutes late. In the interests of time, he has asked me to start the hearing.

I want to thank all participants for their preparation, and involvement in this hearing. We have three participants from Idaho (Potlatch) to be recognized—Kevin Boling, Bill Wall, and Dennis Murphy.

This ecosystem hearing is the second in a series which will continue through 1994. The first hearing was held November 9, 1993. Its focus was on policy, defini-

tion, goals, and coordination between agencies. Various agencies were called upon to describe the ecosystems policies they are developing.

This second hearing today will focus on various innovative, "grass roots" efforts which have begun across the country. These projects have been generated by local/regional problems which have spurred people to action. Most of them started before ecosystem management became a popular concept, but there is much we can learn from them. We want to hear about the successes, and barriers these projects have encountered to understand how those lessons might bear on national policy for ecosystem management.

Senator Daschle and I have agreed on field hearings in August, in South Dakota and in Idaho to gather more information on field applications. Later this fall—this year—a final hearing will be held here to explore real-world implementation problems, such as the intermixture of public and private lands.

Eventually, it may be wise to draft legislation, which will facilitate moving forward with ecosystem management. I suspect there are barriers, such as the species-by-species requirements of the Endangered Species Act, which will need to be cleared before ecosystem management can proceed.

I am cautiously optimistic that ecosystem management may offer an approach which will unify the special interests, who are now divided over the management of public lands. Perhaps we can restore some consistent flow of goods and services to stabilize local communities, while at the same time restoring, and maintaining ecosystems which support a diversity of plant and animal life.

One topic I would like the witnesses to address is the relationship of ecosystem management to the severe forest health problems, we are witnessing throughout the West. As you know, a combination of insects, disease, and drought has severely damaged our forests, and placed us in danger of more frequent disastrous wildfire. A recent report from a group of scientists who studied this problem, and met at Sun Valley, Idaho, concluded that we only have a narrow window of time to reverse this cycle. How will ecosystem management enable the Forest Service and private timber land owners to address this critical situation?

Let's get on with the hearing!

STATEMENT OF SENATOR THAD COCHRAN

Mr. Chairman, I join you in welcoming our witnesses today and thank you for holding this hearing on the implementation of ecosystem management. As we consider changes in our endangered species protection laws and other legislation, we must be aware of the efforts already underway by the Forest Service and other agencies, to deal with sustained development issues.

I applaud the effort find a balanced, common sense approach to the management of our Nation's valuable natural resources which protects fragile species, while ensuring that our Nation can continue to maintain a strong level of sustained development.

I look forward to the testimony of our witnesses, and working with this committee on this important issue.

STATEMENT OF ADELA BACKIEL, DEPUTY ASSISTANT SECRETARY OF NATURAL RESOURCES AND ENVIRONMENT, U.S. DEPARTMENT OF AGRICULTURE

Ms. BACKIEL. I am accompanied by the Chief, as you said. I am also accompanied by Coy Jemmett, who is supervisor of the Prescott National Forest, and Bill Pell, who is Ecosystem Management Coordinator for the Ouachita National Forest, and they are here to really provide us some on-the-ground examples of what has happened.

Senator CRAIG. All right. Would you like them to join you at the table?

Ms. BACKIEL. Yes, I would.

Senator CRAIG. They are certainly welcome to.

Ms. BACKIEL. Thank you.

Senator CRAIG. Why don't you gentlemen come forward.

Ms. BACKIEL. In my summary, I would just like to make two primary points about ecosystem management.

The first is that ecosystem management really has the best opportunities to succeed only if it is done collaboratively. There are many examples of this collaboration that is going on.

In Washington, DC., for example, there is an interagency task force that has probably between 20 and 25 agencies who get together on a regular basis and are very much cooperating in how we implement or how we go about developing our philosophies and implementation methods for ecosystem management, but it is not just being done at the national level either. There are many examples throughout the country where this is happening, particularly regionally.

I was just out in Colorado visiting Region 2, and, for example, they have what is called an interagency Colorado ecosystem management team, and it is composed of seven Federal agencies and seven State agencies. So this collaboration within the Government entities is going on all over the country.

My second point is that this collaboration extends also outside the Government. As you know and as you have stated, Senator, ecosystems cross political boundaries. We respect individuals' private property rights, but the examples that we will show you today and I think the other witnesses will talk about today will show that ecosystem management can be done jointly with all land owners and with all land owners' ideas and philosophies in mind.

Many efforts currently underway include that, and many of those efforts include voluntary efforts by private land owners. In fact, private land owners in some of these situations are not just participating, but they are actually leading the way in many ecosystem management efforts.

Forest Service and Soil Conservation Service, which is under the Assistant Secretary's Office for Natural Resources and Environment, both private assistance to private land owners. That is done when private land owners request it and at their desire and at their need level. This voluntary approach not only encourages partnerships, but my belief is that it also encourages innovations that result in better management.

With that, I would like to have the Chief give his remarks, and he will focus much more on our individual examples that we would like to show you about ecosystem management.

Thank you, Senator

Senator CRAIG. Thank you.

STATEMENT OF JACK WARD THOMAS, CHIEF, U.S. FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Mr. THOMAS. Senator, my remarks will be very brief because I would really prefer that we talk to the people that have been actually doing our first steps in ecosystem management.

In February, though, I did issue a national action plan for the implementation of ecosystem management. Its goals were: (1) adopt an ecosystem management approach throughout the Agency; (2) to integrate ecosystem management into all of our activities; (3) to strengthen our collaboration and innovation; and (4) to ensure our management actions are ecologically responsible, economically viable, and socially acceptable.

This action plan represents the commitment of the Forest Service to shift from the testing and demonstration phase to implementation of ecosystem management agencywide.

As an ecologist myself, I have spent much of my career studying ecosystems and how they work and come away somewhat humbled. These systems are incredibly complex. We are never going to understand them completely. However, as human beings, we have no option but to continue to move forward in natural resource management on the basis of what we know, what we think we know, and what we know we need to find out.

I view ecosystem management as a concept that describes a land ethic that will provide goods and services at sustainable levels for resources, including timber harvest. We need to quickly develop the tools to measure the health and vigor of our forests and range lands and the plant and animal communities that compose the ecosystems. We need to implement management strategies that truly conserve biodiversity, maintain aesthetic values, while producing needed commodities. To do that, we have got to do more than just change the labels. We actually have to change our management.

I will take a few minutes now to quickly look at some examples of how we are implementing the ecosystem management.

First is landscape assessments. The implementation of this type of management requires looking at a landscape scale, rather than a *timber-stand-by-timber-stand* look, to understand how those systems function.

As an example of that assessment, we would look at how an ecosystem functions in the Southern Appalachian Man and the Biosphere Program. We will discuss that later in the hearing.

Another example in the Southeast is the Southern Appalachian Subregional Assessment. It was just initiated in 1994, to coordinate the Land and Resource Management Plans for six national forests simultaneously in the southern Appalachians.

These assessments are not going to replace forest plan revisions, but they will be used to give us a consistent ecological approach as we manage those forests.

Ecosystem management has probably only become possible in the last several decades, as we now have the technology and, perhaps, the level of technical understandings that we need to do the effort.

Now, if we can shift from landscape assessment to project level, I will describe one or two projects.

During the last few years, we instituted many individual projects at the field level under what was called the New Perspectives Phase of Ecosystem Management. That was merely an evolutionary step to where we are today, and New Perspectives was really that, a chance to take a new look, think about things differently, and to come up to the level of understanding about ecosystems that now existed.

Look at the White River Ecosystem Initiative on the Green Mountain National Forest in Vermont. We started the project in 1987 to return Atlantic salmon to the White River. Centuries of farming and stream channelization had resulted in a degraded habitat.

To start to correct that situation, fish habitat and riparian area improvements were completed on the National Forest System lands, but those improvements were just part of the desired future condition for all the streams in that plan.

We signed a memo of understanding with an adjacent land owner to continue those projects on private lands, and we started cooperation with the State fish and game and the U.S. Fish and Wildlife Service in restocking and monitoring.

Other works included trail construction to improve public access, placement of fishing piers, and parking area reconstruction. In short, this entire plan of returning those salmon, which has been at least partially successful, also included people, their use of land, and their use of that resource.

The second, probably the most known to the public is the Kirtland Warbler Recovery Plan in the Huron-Manistee National Forest in Michigan. The decline in that species resulted from fire exclusion. When that began to be figured out—while it seems fairly obvious now, but at the time, it was how could things be getting worse when we were doing such a good job of fire protection, and it actually involved regeneration of jack pine through prescribed harvesting and increased use of prescribed fire.

However, we have not always gotten the dense jack pine stands that were required, but we are doing better and have learned at every step.

With that, there are others that I will present in my complete testimony, but I want to close by saying that ecosystem management is a statement on how the Forest Service hopes to maintain the sustainable supply of goods and services from National Forest System lands. As the Deputy Assistant Secretary mentioned, this change should not be taken by anyone as abandoning or condemning our past activities and actions. We want to build on the past. We want to learn from the past. We want to incorporate that new information that we are learning.

We are going to continue to experiment with implementation of ecosystem management, and these first projects demonstrate the need for additional information and assessment, as well as point out ways to do a more effective and efficient job.

We want to continue to use our State and private forestry staff to provide technical and financial assistance to other land owners, including rural community assistance. All of those programs remain voluntary, and actual decisions are left to the land owner.

That completes my prepared statement, and at your pleasure, I will be happy to respond to any questions.

Senator DASCHLE [presiding]. Thank you, Dr. Thomas, for your testimony, and I apologize profusely for my belatedness, and I want to thank my colleague for starting the hearing on time and appreciate very much his partnership in this effort.

There is a vote, and Senator Craig has indicated his willingness to go vote, and we will try to keep the hearing going.

I have an opening statement that I would like to make, if I could, before I call on additional witnesses, and then we will take our next witness before we begin answering questions.

STATEMENT OF HON. THOMAS A. DASCHLE, A U.S. SENATOR FROM SOUTH DAKOTA

Senator DASCHLE. As the committee has heard in previous testimony, there is a need for Federal land managers to take a fresh look at public lands management to ensure long-term sustainability and to act with foresight to prevent endangered species problems from overtaking management objectives.

The crisis we now face in the Pacific Northwest should be applauded by no one. Environmental objectives are not being met. Species of fish and birds have become threatened and endangered. Economic objectives are not being met. Timber harvesting has been seriously curtailed. Local communities and ecosystems have been placed at risk due to past failures of forest management.

Ecosystem management offers land managers a new tool that will hopefully lead to better stewardship of our Nation's forests. It will impose more responsibilities on land managers, but will also require us to look at many more ecological factors over larger areas. It will be expensive, requiring additional research and monitoring. It will require cooperation between Federal agencies, State agencies, private land owners, environmentalists, as well as the timber industry, and its ultimate success will depend upon the support of local communities.

It is in this oversight capacity with respect to the Forest Service land management that this subcommittee has taken up the issue of ecosystem management to help explore the strengths and weaknesses of this land-management approach.

Last fall, the subcommittee held its first hearing on ecosystem management, and at that hearing, we heard the views of university scientists and representatives of the BLM, the Forest Service, and the timber industry, as well as the environmental community on ecosystem management.

Federal land managers are still in the process of defining ecosystem management. The purpose of this hearing is to learn how these principles of management have actually been applied on the ground. Some very innovative projects are occurring on public lands in partnership with the local communities and universities in the environmental community, as well as the industry.

So I hope today that, by focusing on what people are doing rather than what people are saying, we can identify common objectives that can serve as a basis for uniting historically opposing interests in a pursuit of long-term sustainable land management.

Today, the committee will hear about ecosystem projects that have been occurring across the country. Some of these projects have been initiated by Federal agencies. Others will be initiated by communities and private companies. We will learn from these case studies how these witnesses have met the challenges of complexity, expense, and coordination. The experience gained from these projects can provide valuable insights into how ecosystem management can be implemented and, perhaps, in some cases can provide insights into pitfalls that need to be avoided.

With a common base of information, this subcommittee can move on to evaluate how existing laws, regulation, and administrative procedures define and facilitate the implementation of ecosystem

management by Federal land-management agencies, such as the Forest Service.

In June, the subcommittee is planning to conduct its third and final hearing in this series of ecosystem management. At that point, the Forest Service will have operated under its current system for 2 years. That hearing will focus on institutional, statutory, and administrative issues associated with the implementation of ecosystem management.

I want to thank all of our witnesses for coming, in some cases, great distances today, and again, let me express my appreciation to our Ranking Member for his leadership in this regard.

We have begun with Dr. Thomas, and as I understand it, Mr. Hinote is next. He is the executive director of the Southern Appalachian Man and Biosphere Cooperative in Gatlinburg, Tennessee.

Mr. Hinote, thank you for coming, and we will take your testimony at this time.

[The prepared statement of Senator Daschle follows.]

STATEMENT OF SENATOR THOMAS A. DASCHLE

As the committee has heard in previous testimony, there is a need for Federal land managers to take a fresh look at public lands' management to ensure long-term sustainability, and to act with foresight to prevent endangered species problems from overtaking management objectives. The crisis we now face in the Pacific Northwest should be applauded by no one. Environmental objectives are not being met: species of fish and birds have become threatened and endangered. Economic objectives are not being met: timber harvesting has been seriously curtailed. Local communities and ecosystems have been placed at risk due to past failures of forest management.

Ecosystem management offers land managers a new tool that will hopefully lead to better stewardship of our Nation's forests. It will impose more responsibilities on land managers. It will require us to look at many more ecological factors over larger areas. It will be expensive, requiring additional research and monitoring. It will require cooperation—between Federal agencies, State agencies, private land owners, environmentalists and the timber industry. Its ultimate success will depend on the support of local communities.

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Federal land managers are still in the process of defining ecosystem management. The purpose of this hearing is to learn how these principles of ecosystem management have actually been applied on the ground. Some very innovative projects are occurring on public lands in partnership with local communities, universities, the environmental community and industry. My hope today is that by focusing on what people are doing, rather than what people are saying, we can identify common objectives that can serve as a basis for uniting historically, opposing interests in the pursuit of long-term sustainable land management.

Today, the committee will hear about ecosystem projects that have been occurring across the country. Some of these projects have been initiated by Federal agencies. Others have been initiated by communities and private companies. We will learn from these case studies how these witnesses have met these challenges of complexity, expense and coordination. The experience gained from these projects can provide valuable insights into how ecosystem management can be implemented and perhaps in some cases, can provide insights into pitfalls that need to be avoided.

With a common base of information, this subcommittee can move on to evaluate how existing laws, regulations and administrative procedures define, and facilitate the implementation of ecosystem management, by Federal land-management agencies such as the Forest Service. In June, the subcommittee is planning to conduct its third, and final hearing in this series on ecosystem management. At that point,

the Forest Service will have operated under its current ecosystem management policy for 2 years. That hearing will focus on institutional, statutory, and administrative issues associated with the implementation of ecosystem management.

I want to thank the witnesses for coming today, and ask Senator Craig if he would like to make a statement at this time.

STATEMENT OF HUBERT HINOTE, EXECUTIVE DIRECTOR, SOUTHERN APPALACHIAN MAN AND BIOSPHERE COOPERATIVE, GATLINBURG, TENNESSEE

Mr. HINOTE. Mr. Chairman, ladies and gentlemen, it is, indeed, a privilege to appear here today to describe the ways in which the Southern Appalachian Man and Biosphere program, called SAMAB for short, is implementing ecosystem management principles in southern Appalachia.

Let me begin by saying that the SAMAB program since its inception in 1988 has been concerned with implementing the concept of management of ecosystems. By that, I mean that we have initiated a process for identifying ecosystems of various types and scales and identifying issues impacting them, issues that reach beyond the jurisdictional boundaries of individual agencies and State governments.

In addition, SAMAB has been participating in activities that we are hearing commonly referred to as developing public/private partnerships and reinventing government, but my main focus today is on what SAMAB is currently doing and what we hope to do in the near future, but, first, it might be helpful to briefly explain how the program came into being.

It is not a new program. In 1986, some forward-thinking leaders in the region began discussing the concept when they proposed pilot projects and cooperative system planning and suggested that an ecosystem approach might be discussed with leaders in the area. At that time, it was also suggested that the man and biosphere framework could effectively be used in the southern Appalachia.

Currently, there are eight regional Federal agencies in two States who have signed, and I quote, "an interagency and cooperative agreement for the establishment and operation of the SAMAB cooperative." These eight Federal agencies are the Forest Service, the Park Service, the U.S. Geologic Survey, the Fish and Wildlife Service, the Department of Energy through Oak Ridge Laboratory, the Economic Development Administration, the Environmental Protection Agency, and the Tennessee Valley Authority, as well as the States of North Carolina and Georgia. We expect the National Biological Survey and others to join us in the very near future.

Moreover, it was recognized in the early stages of discussion that the State and Federal agencies could not adequately address the critical problems facing our region. In order to provide for private sector involvement and support, a nonprofit SAMAB foundation was chartered as a major partner with the cooperative in 1990. Since 1990, the SAMAB program has consisted of two interlocking organizational entities, the SAMAB Cooperative and the SAMAB Foundation, and I have with me today the President of SAMAB Foundation, Mr. Robert Kerr, and the Chairman of the SAMAB executive committee, Mr. Brian Adams.

Senator DASCHLE. Welcome, gentlemen.

Mr. HINOTE. The chart here shows this institutional structure. We refer to it as the SAMAB program, and you will note on the left that there is the SAMAB Cooperative and on the right is the SAMAB Foundation Board of Directors. You will also note on that chart that the governing bodies have established six operating committees which are primarily staffed by technical experts from the member agencies, and these committees do most of SAMAB's work.

SAMAB is one of many programs designed as such by the United Nations Educational, Scientific and Cultural Organization, or UNESCO, but the SAMAB program is the only recognized regional program by UNESCO and the United States Man and Biosphere Program.

Now, the heart of each of these regional Man and Biosphere Programs is one or more biosphere reserve units. These are generally protected areas, such as wilderness areas, national parks, and so on. Lessons learned about natural processes in these areas can be used to reach out and influence the surrounding communities. When SAMAB was initially created, there were two reserve units in our area. There are now five, and we expect to add three more this year.

Our research, education, and demonstration programs and ecosystem management center on these units, but extend outward in a zone of cooperation that embraces some 50,000 square miles in parts of six States.

If somebody would turn the chart up there, you can see where the Zone of Cooperation is.

This zone of cooperation was not arbitrarily chosen. It was chosen because it shares common geological, biological, and cultural resources, as well as socio-economic conditions. Moreover, administrative factors were considered in choosing this zone, mainly, the fact that this zone of cooperation lies within the administrative boundaries of the southeastern regional office of the various Federal agencies.

Within this large scale, landscape scale, the ecosystem is a unique mix of scenic beauty, rich biodiversity, traditional mountain cultures, and modern development. This is commonly referred to about the country as southern Appalachia.

The above background, I hope, explains briefly the geographic focus of the program and the institutional structure. Let me now just focus on three examples of how SAMAB is fulfilling its mission in ways that employ ecosystem management principles.

The first example deals with air quality. This is a major problem in our region since there are six areas that have been designated as Class One areas, which means that they are to be given the highest degree of protection possible under the Clean Air Act.

Because of the complexities of this problem, SAMAB sponsored a major forum that brought a wide variety of interested parties together to focus on the southern Appalachian highlands and exchange information and viewpoints on this controversial issue. As a direct result of that forum, eight State air-quality regulatory agencies have organized a regional partnership for collectively addressing air-quality issues there.

This new initiative is called the Southern Appalachian Mountain Initiative, or SAMI, for short. SAMI is now fairly well organized and has already put additional monitoring stations in place.

Throughout this process, our organization, SAMAB, has strength-ened its position with the regulatory community, and members of the SAMAB partnership serve in leadership positions in the SAMI organization.

A second example illustrating SAMAB's contribution to ecosystem management deals with endangered species. When the Fish and Wildlife Service launched its program to reintroduce the endangered red wolf into the Great Smokey Mountains National Park, it knew from experience that it could expect opposition from a fearful public that lacked an adequate understanding of these animals. Public education as to the true nature of the red wolf was urgently needed.

Since the SAMAB partnership was in place and could provide leadership and technical expertise and share resources, it was called upon to develop a public education program which ultimately was successful in diffusing controversy about this reintroduction. Both the public and private sector was involved in this effort.

A third example of SAMAB's involvement in applying ecosystem management principles is, we believe, dealing with community planning. One of our first successes demonstrates that communities can plan for growth in a way that protects the local ecosystem from development pressures.

The people of Pittman Center, Tennessee, a small community adjoining the Great Smokey Mountains National Park, asked for our help in planning for future growth, growth that would protect its community character and its ecology and, at the same time, provide for economic expansion. The results of this work was, we believe, a model plan that in many ways is a practical living lesson in applying ecosystem management principles.

Mr. Chairman, I have focused on three major examples of SAMAB activity that illustrate ecosystem management practices. Without SAMAB, these activities and others listed in Table 2 of the written testimony would not have happened, at least not in so timely a fashion or with such a broad-based cooperative and integrated approach among both the public and private sector.

Now I would like to tell you briefly about our plans for the future. Our main objective now is to become more focused. To that end, a framework has been developed to provide for the orderly identification and eventual solution of issues related to ecosystems of southern Appalachia. Utilizing that framework, we will identify and prioritize the critical issues facing the area and identify gaps as well as linkages among the various agency programs and interest of the public and private sectors.

The Chief mentioned southern Appalachia earlier and some of the things that we are working very closely with that.

Related to this effort to identify and prioritize issues and identify gaps and programs and information, we are currently finishing a business plan that will help us achieve sharper focus over the next 3 years. Under this plan, we have identified three major goals. First is to capitalize on our past successes by reducing additional resource management conflicts in the future.

Second, we want to improve our communication with vital constituencies in the region.

Senator DASCHLE. Mr. Hinote, I apologize for interrupting. Senator Craig hasn't been able to get back yet, and I have got less than 5 minutes to make this vote. So let me put the committee in recess for just a few minutes. When Senator Craig returns, we will continue the testimony.

[Recess.]

Senator CRAIG [presiding]. Mr. Hinote?

Mr. HINOTE. Shall I continue now?

Senator CRAIG. Please do.

Mr. HINOTE. Thank you, Sir.

Senator CRAIG. I apologize and I am sure the Chairman does, but it is the nature of the beast. Go right ahead.

Mr. HINOTE. As I was mentioning, we are in the process of developing a business plan now that will help us achieve sharper focus in the very near future. Under this plan, we have identified three major goals. One is to capitalize on our past successes and continue to reduce resource management conflicts in our region, while we are concerned with promoting the economic development goals at the same time.

Second, we want to improve our communication with our vital constituencies within the region and pursue cooperative efforts with major national initiatives, such as Interagency Task Force on Ecosystem Management, which the Assistant Secretary mentioned, the National Biological Survey, the movement to reinvent government, and so on.

Our third goal is to fine-tune the SAMAB program to better meet stakeholders' needs. We are undertaking a process to identify the critical issues in the region, so that SAMAB can be more specific in addressing specific research and management projects.

The SAMAB program, I believe, has succeeded beyond the dreams of the original founders, and this has led to many demands for SAMAB involvement in problem-solving in the region.

In addition, as the first regional MAB program, recognized by the U.S. MAB and UNESCO, we are frequently asked to assist in other regions of the country and overseas. Earlier, someone mentioned what was happening in Colorado. We have had contacts with them.

As I hope is evident by now, the SAMAB program has been one that has truly developed from the bottom up. Up to this point, what SAMAB has accomplished has been within the constraints of existing budgets of the regional member agencies. This has limited SAMAB's activities.

Now, because of the cooperation and trust that has developed among the agencies, we are seeing increased support and potential new ecosystem initiatives being developed, as the Chief, again, said.

In conclusion, we are very naturally excited about the prospect of achieving an even more effective program, one that is more clearly focused and capable of solving some of the major ecosystem management facing our region and the Nation.

Mr. Chairman, that concludes my testimony. Thank you for allowing me to participate. Mr. Adams, Mr. Kerr, and I will be happy to answer any questions you may have.

Senator CRAIG. Mr. Hinote, let me thank you very much. I will read your testimony, just in case I've missed something.

Mr. HINOTE. Thank you.

Senator CRAIG. Absolutely.

Now let me introduce to the committee Dr. Gregory Aplet. Dr. Aplet is Forest Ecologist for The Wilderness Society here in Washington.

Doctor?

**STATEMENT OF GREGORY APLET, FOREST ECOLOGIST,
THE WILDERNESS SOCIETY, WASHINGTON, DC.**

Mr. APLET. Thank you very much. I feel a little bit like an odd-ball here in that The Wilderness Society is not actively involved in the kinds of local cooperative efforts that are being described around the table here, but I will try to reflect some of our thinking on this subject.

In 1991, The Wilderness Society established the Bolle Center for Forest Ecosystem Management as part of its program to promote sustainable forest practices. We are interested in ecosystem management as a process that leads to sustainability, and for us, sustainability has to include the conservation of biological diversity and the maintenance of the productive capacity of ecosystems. To us, that is the litmus test.

As ecosystem management develops as a concept, I think we are all discovering that it is much more complex to put in to practice and that it involves very complex social issues as well as technical issues. It is those social issues that we are discussing mostly here today.

At The Wilderness Society, we recognize the importance of cooperation in order both to address the problems of multiple ownership and to apply general concepts to the specifics of regional and local ecosystems, but we emphasize that environmental laws and procedural laws at the national and State level cannot be violated in the process of forming local cooperative groups and coming to local consensus. We believe that socially optimal decisions will result at the local level only if they are made in the context provided by the laws of the State and the Nation.

One of the greatest obstacles to the implementation of ecosystem management is the current absence of an effective framework that allows the concerns of the larger society, a sector of which we represent at The Wilderness Society, at the level where the tough decisions are made, on the ground at the local level. We feel that the ability to get the concerns of the larger society represented down at the local level is one of the greatest challenges that we face. That is, of course, not unique to ecosystem management. It is the great challenge of Federal democracy, but it is something that has to be addressed.

Today's hearing highlights several efforts that take more of an ecosystem approach to management through local planning. While it is still early to judge the ultimate success of many of these efforts, where projects appear to have been most successful, they

possess two important characteristics. One, they operate clearly within the law, and two, they have been based solidly on ecosystem science.

In my written testimony, I identified several principles of ecology that I think bear heavily on ecosystem management. I don't want to take up time addressing them here, but I do want to emphasize that for ecosystem management to be successful, it has to be grounded in science.

That doesn't mean that science will provide "the answer." As the Scientific Panel on Late-Successional Forest Ecosystems reminded us, science can only inform the process and help identify ecologically sound options; the choices must be made by society.

What has distinguished the more highly regarded efforts of cooperative ecosystem management at the local level is not a reliance on science for the answer, but an insistence that the decisions be informed by science. Science has helped to shape a vision for the land that is the objective of management.

I just want to mention two examples that haven't been mentioned here today, but I think probably should be. One is the efforts on the Chequamegon National Forest to develop an implementation plan for the conservation of biological diversity. The managers on the ground are working cooperatively with the scientists from the North Central Forest Experiment Station. I think it is a very productive effort.

The other is the Applegate partnership in southern Oregon, that has received a lot of attention. The key to the success of that partnership, I think, has been, one, strong representation across the spectrum of interests, but more importantly from where I sit, they have involved an independent scientific advisory board to help them shape their vision of the land.

Elsewhere, the Forest Service is attempting to arrive at a vision for its lands through the implementation of the concept of desired condition, and as I understand the way it is being developed in the Eastside Ecosystem Management Project and, a very recent effort, the Region Five Draft Ecosystem Management Guidebook, desired condition is meant to reflect human choices informed by an understanding of the ecological capability of land and water ecosystems.

In those efforts, sustaining diverse healthy ecosystems is the overarching objective, but subordinate objectives and the means to achieve them are decided through a political process that transcends all scales from the local to the Nation.

In conclusion, it remains to be seen how effective the Forest Service will be at integrating preferences of various communities of interest, local communities, and the Nation, through the desired condition concept, but it appears to be a step in the right direction. The Wilderness Society is committed to participating in the further development of ecosystem management at the Forest Service and elsewhere, as we feel the concept represents an encouraging step toward a diverse, healthy, sustainable future.

That concludes my remarks.

Senator DASCHLE [presiding]. Thank you. I appreciated every word you said. In all sincerity, we do appreciate your testimony and your willingness to participate in the hearing today.

Our next witness is Mr. Kevin Boling, the Resource Manager of the Western Wood Products Division of Potlatch, and he is from Lewiston. So, perhaps, my colleague would like to make additional introductory remarks, but we are very pleased you have come all this distance.

Mr. BOLING. Thank you. Thanks for having us.

Senator DASCHLE. Larry, do you have additional remarks you want to make?

Senator CRAIG. Mr. Chairman, I do. I am extremely pleased that Kevin is here and that the Potlatch Corporation is allowed to participate and to explain to us a variety of the ways they have managed their very substantial land holdings in Idaho.

In an interrelationship with Federal lands and their private land, they have moved ahead as a private company in implementing what they view as a system of management that involves the whole of the ecosystem. I thought it would be extremely valuable to have this testimony today to compare it with what is going on, on the public side, to see where those relationships begin to cross lines and to interrelate, as they must if we are to be successful in this approach.

So, Kevin and to the Potlatch Corporation, we are pleased you are with us today.

STATEMENT OF KEVIN BOLING, RESOURCE MANAGER, WESTERN WOOD PRODUCTS DIVISION OF POTLATCH CORPORATION, LEWISTON, IDAHO

Mr. BOLING. Thank you, Senator Craig, and thank you, Senator Daschle.

In addition to being a Resource Manager at Potlatch, I am also a Harley-Davidson owner, and I enjoy visiting Sturgis, South Dakota, on an annual basis.

Senator DASCHLE. Great. We hope you are coming this year.

Mr. BOLING. It is a great place.

By the way, joining me are a couple of teammates, Dr. Bill Wall, our wildlife biologist, and Dr. Dennis Murphy, who is our GIS information manager.

In northern Idaho, Potlatch operates sawmills, plywood plants, a large pulp and paperboard and tissue complex. Many people in our rural region are dependent upon us, including more than 3,000 employees. This is not a lot of people by Washington, DC. standards, but it is certainly significant in our area.

We own roughly 670,000 acres of forest land, which provide about 65 percent of the wood we need for our sawmills and plywood plants, and about 25 percent of the raw material for our pulp-based operations. The remainder of our raw material comes from other ownerships, including lands owned by other private interests, as well as by both the State and Federal Governments.

Our lands are intermingled with other ownerships, and since natural resources do not normally recognize property lines, it is often helpful to cooperatively manage across ownership boundaries. This provides the diversity and balance of forest conditions necessary to enhance and protect healthy ecosystems fully, but does so without compromising the rights of private property owners.

Last summer, Potlatch proposed to the Palouse Ranger District of the Clearwater National Forest that we give a cooperative pilot process a try. At that time, we did not have a planning process to integrate resources across two land ownerships. A major objective of the pilot project was to develop this process. We wanted to define common management goals while respecting the differences in specific management objectives. We selected a small watershed as a pilot area to create and test a planning process. The results of the project are described in the document you have before you.¹

Let me highlight a few of the issues that we raised in the document, and it summarizes the results of our efforts.

First, cooperative planning requires a common base of information. By information, I mean data with a purpose. Our process builds a site-specific database with sufficient resolution to allow for a field-level land manager to implement a resource management plan.

As many of my colleagues would attest to around the table, when you talk biosphere to a land manager, it is very difficult for them to take the biosphere concept and implement it at the ground level, and that is where we seem to have a large barrier. We think we have an answer, though.

This process identifies key forest structures on the landscape and their function. This aspect of the process facilitates cooperative planning in an ecological framework. It also respects the confidentiality of sensitive commodity-based forest inventories. Agencies do not necessarily want private industry to have access to their detailed timber inventories, and we do not want to give our inventory information to others as well.

We initiated a current condition assessment. This assessment was an integrated analysis of stream health and water quality, wildlife habitat, silvicultural potential, recreation facilities, and a transportation plan. Objectives were developed for each resource by the appropriate specialists, but were reviewed by all members of the planning team to identify complementary or conflicting objectives.

These objectives were defined for the landscape from the current conditions assessment, and this point is key to the concept of adaptive management.

Guidelines are developed recognizing the conditions of the site rather than applying uniform standards across every landscape.

The assessment of current conditions is the starting point for preparing landscape objectives, not an end in itself. The planning process continues with the design of future landscapes. Silviculture, harvesting, and road management are primary tools to achieve desired forest stand structures. Timing and the total area affected by these tools are major considerations.

Technology now allows us to evaluate the effects of these planned activities on future landscape conditions. Alternatives can be generated and tested efficiently prior to plan adoption. Results are affected in part by the timing and magnitude of the disturbance introduced into the landscape.

¹The document is retained in Committee files.

In other words, you can take the various forest structures, implement your particular plans within those forest structures using the power of GIS, analyze and aggregate those stand-level decisions to a watershed and to a landscape, evaluate the effects of those decisions on the landscape, and then aggregate back down if you need some other particular objective.

This combined evaluation of activities across ownerships demonstrates that differing management objectives can complement, rather than hinder, good stewardship.

Although the project was a prototype and not a final plan, there were tangible benefits. The cooperative road plan reduced total road miles required. We had identified independently about 19 miles of road to build in this particular small watershed. As a result of our cooperative planning, that was reduced to about 14 miles of road.

In addition to the financial benefit of building fewer roads, this reduced the potential sources of stream sedimentation. A cooperative road maintenance plan is under development to reduce erosion from existing sites within the watershed, and in addition, sensitive riparian areas that cross ownership boundaries have been identified, and these areas will be treated with minimal disturbance.

Additional benefits will be realized as we proceed beyond this prototype stage. Potlatch intends to develop landscape plans across its entire 2.2-million-acre operating area, which is the map you see there on the wall. Our ownership happens to be in red and the salmon color. The State of Idaho is in blue, and the Forest Service is in green, and then there are many other private ownerships in white. BLM is yellow.

In the immediate future, we plan to develop a similar cooperative plan with the Idaho Department of Lands. This November, another area will be jointly selected with the Palouse Ranger District and the process initiated for a 30- to 40,000-acre landscape. It is our intention that, in joint cooperation with the Palouse Ranger District, the Idaho Department of Lands, Idaho Fish and Game, and whom-ever else we think is an important stakeholder, that we proceed jointly to develop the plan for this pilot area that is much larger.

In addition, there are at least two other potential cooperative efforts under discussion with other districts on two national forests, both in the Panhandle National Forest, on the St. Maries Ranger District, as well as another district on the Clearwater.

The public's interest in natural resources is changing the standards for forest management. We respect that interest and are firmly committed to an adaptive landscape management approach as a way of achieving high standards of land stewardship while simultaneously providing wood products from American families. Cooperative landscape planning can contribute significantly to this goal. We are convinced the results will be superior to those achieved from efforts which concentrate on a single resource or on a single ownership.

I would be happy to answer any of your questions, but the tough ones, Dennis and Bill will take. Thank you.

Senator DASCHLE. Well, brace yourself.

Thank you for an excellent testimony.

Could you give us some idea? Senator Craig and I were just trying to get a better understanding.

Senator CRAIG. I said that it is either as big as Rhode Island or New Jersey. Which is it, Kevin?

Senator DASCHLE. Tell us a little bit more about that map.

Mr. BOLING. Sure. Up here in the left-hand corner is Lake Coeur d'Alene.

Senator DASCHLE. I am familiar with that.

Mr. BOLING. So Coeur d'Alene, Idaho, is just off the map.

Senator DASCHLE. OK.

Mr. BOLING. Down here is Lolo Creek, and just off the map is Kamiah, Idaho, and air miles, that is about 120 air miles.

This is the National Forest boundary here. So to the right up there would be the traditional Clearwater National Forest, the Idaho Panhandle up in the north, and as far as the average distance across there, it is about 50 or 60 miles.

On our ownership, which is 665,000 acres, we have inventories about 12,000 miles of streams, for instance. It is a rather extensive ownership. Our topography is basically mid-elevational, about 3,200 feet, and when Potlatch acquired these lands around the turn of the century, they were acquired primarily for the magnificent stands of white pine that were there. The white pine is mostly gone as a result of an introduced disease called white pine blister rust.

Senator DASCHLE. I have a Senator who is trying to reach me.

Our final witness is Mr. John Sheehan. Mr. Sheehan is the executive director of the Plumas Corporation from Quincy, California.

Welcome, Mr. Sheehan.

Mr. SHEEHAN. But you wish to make a phone call.

Senator DASCHLE. You go right ahead.

STATEMENT OF JOHN SHEEHAN, EXECUTIVE DIRECTOR, PLUMAS CORPORATION, QUINCY, CALIFORNIA

Mr. SHEEHAN. Thank you to the Chair and the Vice Chair for asking us to testify.

At the Northwest Forest Conference last spring, the environmentalist Andy Kerr said, "When you say ecosystem management, I hear 'ecosystem,' while a forester hears 'management.'" The carrying out of this new approach to the forests and rangelands will take a continuing definition and redefinition of terms that will gain and lose currency while the sea change takes place. The key, I believe, along with Kevin, I think, is to constantly keep the focus on the ground in question, on the stream reach, forest stand, pasture or community that is the subject of our attention.

I work for the local nonprofit economic development corporation in a mountainous, forested county of 20,000 people. Plumas County has three-quarters of its almost 2 million acres, similar to this size territory, managed by the Forest Service for the people of the United States.

Our organization was set up in 1983 in response to a 22-percent-annual unemployment rate, that was at the time of the recession, and a local perception that our timber-dependent economy needed diversification. Attached to my testimony is a review of the current economic dependency of our area on the national forests that is in the packet that you have.

We carry out tourism promotion as well as business attraction, retention, and expansion programs, like nonprofit economic development corporations do throughout rural parts of the country. More on this point, however, since 1985, we have been carrying out a wide range of stream restoration, research, and management modifications throughout our watershed.

All of our modifications have and will go through the rigors of the National Environmental Protection Act as well as the California Environmental Quality Act. All of our major projects have had third-party monitoring done on them.

We operate within an enabling framework that was called, by the Federal agencies that put it together in 1980, Coordinated Resource Management, or CRM. The key to CRM is its ability to share staff and resources among the partners while focusing jointly on particular landscape segments or management issues.

We broadened the concept locally in 1987 when we adopted our formal memorandum of agreement, which is attached, by including local governmental entities, which normally top-down solutions are left out of that loop, ourselves, Plumas Corporation, and our regional utility company, Pacific Gas and Electric. From the effort's initiation, Plumas Corporation was given the role of coordination and implementation of the efforts. This was due to the other participants' perception that we had the least disingenuous of motivations; that is, the retention and creation of local jobs. Everybody knew that. That is why we were in it, and that is what we are set up to do.

We have completed during that period dozens of planning and *on-the-ground* projects. We have used a variety of time-worn techniques, including those that were used by the Civilian Conservation Corps in the 1930s and those that are more of a modern nature.

As a direct result of our projects, we now have trout passing through stream systems where there have been barriers for 50 years. We have significantly reduced erosion and treated areas. We have 600-percent increases in water fowl on monitored projects by third-party monitoring. We have created wetlands in pure late-season streamflows. All of our projects have used locally available rocks and plants as the prime building materials. All of our construction contracts have gone to local firms, primarily for heavy equipment operation and material transport, although there are also a number of manual labor jobs involved.

Three businesses have started due to our mutual efforts, a wholesale nursery, a stream monitoring and environmental analysis firm, and, most happily, a watershed restoration program with an associate degree at the local junior college and a full curricula through the elementary schools in our county.

Although we don't use this term much locally, we focus on cumulative watershed effects remediation. The reason we don't use it locally is people don't talk that way in the real world.

We also work on public and private multiple-use lands. Our project designs from the get-go have sought to mimic natural functions. In all cases, the land owners lead the process since all the projects have been voluntarily undertaken.

The local resource conservation district, which is primarily private ranchers, serves a critical role as the liaison between the public regulators and the private land owner. They are the group that approves each project before it gets into this broader CRM framework.

Their long-term horizon provides the prospective to properly prioritize our efforts. Certainly, I believe that the SCS and the resource conservation districts' role should continue to be tied to the resource base as opposed to the commodity exports, as some wanted it to be.

The development feeding and success of the CRM has come about through the locally driven, ongoing, voluntary, consensual partnership of the 17 signatories to the memorandum of agreement, each responding to enlightened self-interests. The specific arrangements vary from project to project, although they are usually a dozen public and private financial contributors to each major project.

The organizational structure—and there is a chart² attached to the testimony—is decidedly non-hierarchical. It was not invented within this beltway, and it was not invented by regulation.

We have organized ourselves to provide constant feedback loops to modify our practices and our projects. We have both a functioning pipeline of planning and design, and we deliver on-the-ground projects. I offer this chart not as the *be-all-end-all* of such charts. It is not, but it is a contrast to the non-exclusionary rote methods by which people have been forced by law and regulation to carry out tasks and make decisions within the Forest Service.

Now we have begun a broader effort that looks at a forest management and restoration program for public lands in the Feather River watershed. It is called The Quincy Library Group. Some of you were visited in February by members. Both of you were visited in February by members of the library group, as was Dr. Thomas. This locally initiated effort extends the watershed restoration work that the CRM has accomplished and proposes a strong monitoring function, as with the CRM.

The library group builds on the harvesting practices of one successful local mill, Collins Pine Company, which I believe is the first major mill in the country to receive the Green Cross Certification for its environmentally sound practices on its own local forest.

The library group also posits a major fuels reduction program, along the lines of what the Senators were talking about earlier, to decrease the incidence and severity of stand-destroying fires that will ruin the trees, habitat, and critters. We hope that this program will also provide enough timber to run the existing local mills, if the Forest Service can gear up to carry it out. We believe that this and other partnerships won't succeed unless the Forest Service finds new ways to afford meaningful, positive, and ongoing public involvement.

We believe we are the first group to come to you with a locally initiated, consensus-driven ecosystem management program emboldened by the on-the-ground experience to back up our words.

We have reached consensus because we have found a set of principles that are agreed upon as opposed to focusing on divisive is-

² Retained in Committee files.

sues. We propose some major changes to the land-management plans on the three national forests in the library group area within the framework of the National Environmental Protection Act.

First, no timber targets are to be set. Outputs are to be expressed in acres treated per year to achieve forest health. The library group uses the "mimic natural functions" principles. We propose to reintroduce the role of fire into the ecosystem over time in coordination with an aggressive thinning-from-below timber program.

This will, we believe, prevent the stand-destroying crown fires that are increasing threats to all the Forest products and creatures in the West. We propose uneven age management and a longer harvest cycle. Sensitive, roadless, and wilderness areas are, in effect, left off the map, in that they won't be subject to interventions during the 5 years of The Quincy Library Group proposal. Fireproofing around those areas will be addressed.

The experience local groups, like US and Applegate, have gained through the authorities contained in the 1990 Farm Bill, particularly in Subtitle G with its emphasis on locally generated efforts, lead us to hope that you will greatly expand those authorities in the upcoming Farm Bill reauthorization.

State, private, and cooperative forestry at the Forest Service can assume a larger role in facilitating this ecosystem and other restoration partnerships on Federal lands. New Forest Service flexibility in end product contracts, KV funding deregulation, local cooperative agreements, subcontracted third-party monitoring, and service agreements must be put into place to allow for local and environmental buy-in to a downsized Forest Service ecosystem management.

All the Federal agencies are going to continue to shrink. Reinvention of the Government must include ways, such as those addressed above, to carry out the necessary environmental and economic functions that our forests and rangelands are supposed to perform, but have not and will not be able to perform under the current budgets, authorities, and ways of doing business.

Subtitle G authorities and appropriations should be expanded to allow reinventing government pilots for ecosystem management to be designated in areas like ours with active, ongoing, and successful partnership programs.

We have asked for congressional funding to carry out the library group project, as you know, but we also realize that there isn't enough money, and it doesn't seem that there will be enough money, to take care of all our prospective work. We have done some watershed analysis that says that the level of funds we need are \$183 million in one 700,000-acre watershed.

We should be permitted and encouraged to pursue long-term, market-oriented reinvestment strategies. These would include green cross-type certification for whole watersheds and all their outputs, FERC relicensing preferences for hydroelectric producers, projects that improve their watersheds, and also forest health and watershed improvement contributions by downstream water users.

These are the long-term solutions that we are looking towards, and I will respond to any questions. Thank you for your interest.

Senator DASCHLE. Thank you very much for an excellent testimony. It is exciting to see the innovative approaches that are represented at this table and the diversity in effort that already exists in this early development of ecosystem management from a lot of different perspectives.

In that regard, let me ask the Forest Service. We have got a lot of different projects that are all described as ecosystem management, but all somewhat different from one another. How do you go out to your field managers and explain to them what is appropriate and what is not under this big umbrella, Forest Service management, Dr. Thomas?

Mr. THOMAS. Poorly. It is almost possible to take anything you do on the land that does not destroy the capability of that land into some context of being ecosystem management.

As I view ecosystem management, I think as the Forest Service will view it, first, we have an overarching vision of what it is.

Senator DASCHLE. You do have one?

Mr. THOMAS. Yes, and I am going to tell you.

Senator DASCHLE. OK.

Mr. THOMAS. At least I have one. I am working with my people to see if we can jointly agree that I am correct.

Senator DASCHLE. That would be a step in the right direction.

Mr. THOMAS. I know this is going to be subject to a lot of discussion, but, largely, ecosystem management at the moment is a concept that has to be put into context. The concept, as I view it, we have an overarching view, and that view is that ecosystems must be sustained over time. In essence, they are the geese that lay the golden eggs, and in order to sustain their ability to absorb shock and to produce goods and services over time, we have to sustain that ability. That takes in a combination of things. One of them is the preservation of biodiversity. It doesn't mean that it stays in the same place, but that those building blocks are there to be moved around over the centuries, over that system, in order to sustain it.

So, if that is, indeed, true that we have the overarching concept that the health of the system, which is its ability to absorb shock, which is related to biodiversity, then that becomes an objective and, simultaneously, for the first time in our history, an ethic. That becomes the ethic of land management.

Now, given that overall view, it requires that we pull up and begin to view things from a higher altitude, if you will; instead of one timber sale at a time, one road at a time, one watershed at a time, that we view it from a larger landscape scale.

We have known that we ought to be doing that for a very long time, but, suddenly, we now have the technology that makes that a feasible thing to do and within a reasonable cost.

Now, given that as the overarching view, then, in realism, we have different land ownerships. All treatments of land take place in individual actions, one timber sale, one road, one reservoir, one action at a time.

The trick is how do we put those single actions into the context of the overview. What we have now, because of the way we have been, we are doing one thing at a time at relatively smaller scales, even though they are getting larger, but they are still relatively

small compared to the overall landscape, and I think that is good and an appropriate step.

The next step will be that overarching view. Now, that will lead quickly to the discussion, if you ask the Forest Service, "What do you mean you want to do this for everybody?" No. We have got more than enough to do, in one sense, of dealing with our own efforts. However, I think, cooperatively, with the kinds of people that you hear around this table today, and there are many hundreds of others, that we can put together the technology, the context, the ability to analyze across landscapes, across watersheds from the ridges to the ocean, and we can say, "We have the technology. Do you want in?", to the States, to large land owners, to smaller land owners. That ability can be put together. It can be extended through State and private forestry. It could be extended through the Soil Conservation Service. It can be extended through large companies. It can be extended by the Ag Extension Service. We have ability to do that, and that is what I visualize our mission to be, beyond the Federal lands itself.

Now, the trick is, again, to take that concept and produce a context within which we can measure individual land actions and what they might product over time.

Senator DASCHLE. So, in other words, you wouldn't be prepared to define ecosystem management in terms of practices at this point because you are not there yet. You are looking at a larger, more generic management agenda that, ultimately, will bring you to that point, but you are not there yet. Is that a fair assessment?

Mr. THOMAS. No. I would almost answer the question yes, but not quite.

Somebody was interviewing me the other day from Popular Science and said, "Please take me out and show me 250 acres of ecosystem management," and I said, "Well, that is fairly easy. I can do that, but when I show it to you, you will say, 'Why is this ecosystem management?'" and I will say in this very sense, the system has a chance to survive here." In this context, we are not putting the soil down the stream. There is some of this stuff that loops back to being incredibly simple. Keep the soil where it is. Don't fill the streams full of silt. Keep the water clean. Be healthy. Retain the ability of that site to produce biomass, and retain somewhere nearby the biodiversity that can reoccupy that site at some time in the future.

We have always known that in conservation. The latest thing, if you have noticed, everybody wants to know how you are going to deal with your customers. That is an end thing. How do you deal with your customers in ecosystem management? We have to understand that most of our customers for ecosystem management are not alive yet. Essentially, it is a contract across generations, a contract with ourselves, and it makes immanently good sense.

You can view it one way as being very pragmatic of the goose that lays the golden eggs, if you are a utilitarian. If you look at it from the other standpoint that it has value in and of itself and you still like to live in a house and eat, it still makes good sense.

We are not there yet. We may never get there. I think it is a path that we step out on under this concept and context, and it will always be evolutionary and adaptive in its approach, but if you

look at how we have treated ecosystems elsewhere in the world that have been occupied for a long period of time, our track record is not good. I think this is a context in which we can improve that record.

Senator DASCHLE. Let me ask any of our other witnesses if they choose to comment on that which they have just heard as the initial contribution to the definitional view of ecosystem management. Do you have any problems with that or do you support it?

Mr. BOLING. No. In fact, I share Dr. Thomas' philosophies almost entirely, and I would like to demonstrate one way that we can get our arms around this.

Senator DASCHLE. Sure.

Mr. BOLING. In your book there, if you grab the objectives tab, immediately preceding that objectives tab are two photographs.

Senator CRAIG. East Fork and Meadow Creek?

Mr. BOLING. Yes. If you turn to the first photograph, you will see a 1933 aerial photography of this area where we initiated this project. What you see there is basically the results of a vegetational evolution as a result of a fire, a stand replacement fire in 1870 and 1880.

Senator DASCHLE. What is the white?

Mr. BOLING. The white is just the burned-over southern exposure.

Senator DASCHLE. Burned over. OK.

Mr. BOLING. You will notice in the creek bottoms there the riparian areas that are left primarily intact.

I turn the page. I apologize for the clarity of the photograph, but this is 1992, the same area, and you can see that, for the most part, those areas that were white on the previous photograph have now revegetated, and for the most part, we have almost 100-percent-crown closure, almost the entire watershed, and instead of a fairly well-developed riparian area in the stream bottoms, which was largely white pine and cedar, those things have been removed, and that vertical structure within the riparian areas are gone.

Now, if you turn to the evaluation tab, the last tab in your book, and then the color graphic just in front of that, you will see that through inventories that the Forest Service made in the early 1900's that there is a pattern there of old growth, second growth, and a disturbed area, the disturbed areas being the red in that graph, the second growth being the green, and the old growth being the dark green.

Then you have the evaluation. We were able to do this through GIS which aggregates these different land classifications, and it begins to quantify them for folks at the ground level who begin to understand how they can change things through management.

You will see the current condition there in 1993, which is almost all a closed-canopy forest cover and not nearly the kinds of disturbance that had occurred around the turn of the century.

What the next three graphs there or bars are, what we intended to try to manage for were the 30-percent-crown closure, 70-percent-crown closure, and on the Forest Service, basically, managing for old growth. What you see there is you get a continuing decline in disturbance as compared to what nature had left that site with around the turn of the century, and then you can begin to quantify

the effects on water and wildlife and the way things look and make very informed decisions about how you change those patterns based on the structures across that landscape.

There are tools—

Senator DASCHLE. That is very helpful.

Mr. BOLING. —powerful tools there that allow you to begin to change things to fit your goals and objectives of what you are trying to accomplish.

Senator DASCHLE. I want to revisit a little bit of this, but let me ask Senator Craig if he has some questions he would like to ask.

Senator CRAIG. Let me see if I can integrate a question that many of you might like to respond to starting with you, Chief. You have given us at least your vision and how that might begin to take form. In my opening comments, I spoke to the need to understand some definitions.

Not long ago, I guess it was last month, Will Stelle from the White House Office of Environmental Policy said that the administration does not want to be too definitional in its approach toward ecosystem management. He said it would give ecosystem management too much credibility. Do you agree with that statement?

Mr. THOMAS. I don't understand it. So I guess I can't comment.

Senator CRAIG. Well, I am not sure I did either, but that is what he said.

Mr. THOMAS. Let me tell you what I think. I don't want to interpret what Mr. Stelle thinks.

I think it is too soon to produce a manual to hand to our land managers and say, "This is ecosystem management. It is defined precisely on page 1, and you will proceed through this to do it." I think that is basically what he meant, that it is not yet, and I hope never will be, a time to sit around and write a very definitive manual on how this evolves because I think it will evolve quickly and continuously. I think that is what he was saying is it shouldn't be too rigidly defined and prescribed or, essentially, we will have destroyed what we are trying to put together.

Senator CRAIG. With that thought in mind, we heard today from Dr. Aplet, that for the purposes of acceptance, there had to be some ground rules and some degree of top-down management for "social acceptance." Is that a misinterpretation, generally?

Mr. APLET. I think that that would be a fair representation.

Senator CRAIG. We are hearing from people working at the local level interfacing with the Forest Service in relationships that are somewhat experimental in nature that are clearly not top-down at all. They are bottom-up.

How do we satisfy The Wilderness Society and, at the same time, be creative and evolutionary in the definition or the interpretation of ecosystem management and not find ourselves in a conflict again over how we manage these resources? That is my frustration in saying yes, this makes sense, while recognizing that there are national groups that think you have to maintain a national perspective. They are very nervous about giving flexibility on the ground. That has led us to endless lawsuits and appeals and as we have worked through our forest plans and implementing those.

Would you all join in, in that general thought or comment? Have I misunderstood and therein lies my frustration? How do we get

players in all of this—and there are many, at the table—with out some definitional, measurable, trust-level kinds of processes for all of us to work from?

Mr. SHEEHAN. We have, along with Applegate, put in an application with the Ford Foundation to help us to develop a system of standardization among green cross-type certification programs. So this kind of feedback loop, this third-party monitoring that I am talking about can be more institutionalized and agreed upon by the environmental community as well as the industry; that there is a standard that people are working towards.

the Forest Service does a wonderful job in a lot of things. One thing they haven't done a good job on is building credibility in terms of their monitoring of what goes on in the ecosystem. That is why I think third-party monitoring is really critical, and I think that could provide the means by having that feedback loop to the national environmental groups, if you will, that will provide the certainty that things are being done right.

Senator CRAIG. Any further comments or reaction to that?

Mr. APLET. I think that flexibility is absolutely key. Mr. Boling mentioned adaptive management; Dr. Thomas discussed the evolving nature of management; and Mr. Sheehan just mentioned feedback. Those are key concepts. There has to be some means to allow us to learn from our mistakes and correct them and move forward.

That is why I describe ecosystem management as a process, and I think that Dr. Thomas is absolutely right. If we write ecosystem management as a rigid set of bounds or standards, we will end up, as information evolves and as the landscape evolves, being off target once again. So it has to be a process.

Mr. THOMAS. Senator, I would like to respond to that. First, let's just face it. The agency which I head is not totally trusted by many people that we have to deal with.

Senator CRAIG. All parties involved.

Mr. THOMAS. Well, I hope not all parties, but I am not so sure that in pleading guilty to that, that I have pleaded guilty to any great sin. We are in an evolutionary process of change, of adopting, and adaptation, but I think it can be cured by the overarching principles being set forward. Then we have to understand that the root word of economy, economics, ecology is "oikos" from the Greek, meaning house or home; that ecosystem, obviously, contains people. You know what? People are not the same everywhere. They have different cultures.

If we can't make our decisions within a decision space that is bounded by science economically practical, ecologically acceptable, culturally acceptable, socially acceptable, and politically possible, it won't stay there. We can't put it in that box because it won't stay.

We have to recognize that when we do planning, then, under the umbrella and we start the individual projects, that includes people in different places, with different cultures, with different views, with different needs, and if we can't adjust to that, one cookie cutter doesn't fit all. It really doesn't.

We did a good job, but we failed, largely, under the NFMA of trying to involve the public. The encouraging thing was, if you are looking at The Quincy Library Group, the very people that helped that process fail, were the people that looked up and said, "Oh, my

God, we now have something we can't live with." Maybe we can get together. We step back.

They have come now with some ideas that I think are good. We have agreed that we think they are good, and we will try to work with it.

We put the adaptive management areas together under the President's plan with that idea in mind that we have to be able to try some new ways, not only ecologically and technically, but in terms of how we work with people to come to conclusions.

The national groups are obviously nervous, perhaps justifiably so. When you have resource-based communities, they are going to be very interested in their welfare. The danger is, perhaps, too interested to meet the national purpose. That is why we need some overarching concepts, ideas, and laws. I think, maybe, they are too rigid. We are pledged to obey the law. We will do that, but we still have to operate from the ground up, and if that ecosystem doesn't include people and their culture and their needs, where it exists, we won't succeed.

Senator CRAIG. In that context, can you explain it under the planning process? It was as good as we could get at the time, but it seems to be in trouble today in relation to certain measurements.

A perfect example is the Clearwater Forest and its ASQ. We are able to achieve maybe, 10 or 13 percent of projected ASQ without finding ourselves in conflict with other people's interpretations. For certain obvious reasons, there appears to be a need to evaluate or to measure.

From the environmental side, there appears to be a need to evaluate and measure impact on a variety of systems within a larger system and its health. On the other side, there definitely appears to be a need to measure the availability and access to timber supply and sustainable economics within a given community. Can we invest in a mill that will operate for 20 years based on a given supply of timber?

How do we measure in a system of the kind you are defining for us?

Mr. THOMAS. When we went through our processes and put forward the things we were going to do, monitoring was part of that. Nearly every plan had a monitoring plan, perhaps by today's standards inadequate, but by the standards of the day. Most of them were not spelled out exactly what we would do except to say we will monitor, and if we will monitor our application, did we put on the ground what we said we would do. Performance, did it do what we thought it would.

We didn't monitor. Monitoring is expensive. I haven't looked at the record since I have been Chief to find out exactly what happened, but I suspect that under budgetary limitations, through the process, we got funded to build the roads, cut the trees, make our other operations, action operations, but were not funded to monitor. We were always going to do that next time.

I think a lot of us can share in that responsibility, but we didn't. It wasn't that somebody else was watching us because our monitoring wasn't good. It was merely that we weren't monitoring adequately. We weren't funded to monitor adequately. Perhaps we all should have screamed more loudly. We didn't, but we have not

monitored appropriately. I think if we had, we would be in a much better position today.

I don't think it is necessarily anybody distrusted our monitoring. It was that we did not perform as promised under the Forest plans. I think a good monitoring approach applied, however, would go a long way toward a solution to the mistrust.

Again, one of the things, we never monitored again after we projected our ASQ numbers. There were a number of assumptions that have to go into those kind of models. Fairly quickly in the process, it was obvious that some of those assumptions were a little hay-wire, but we did not have enough monitoring data to be able to correct, and we should have. There was nothing wrong with being too high. We could have been too low, but we just didn't have the data to adjust, and we didn't.

Senator CRAIG. Mr. Hinote?

Ms. BACKIEL. Senator, let me also suggest something that also might help with the perception of mistrust, and that is, as I think Mr. Sheehan pointed out, the public participation process.

People who have participated in that process have not always been happy with the results of their participation. I believe, as I said earlier, that through ecosystem management and through this collaborative process, which is ecosystem management, that that will also help by their participation in that process. That will also help solve some of the mistrust problems because all of us will be participating together, and when you do that, that builds trust. It doesn't make it go away. It builds it.

Mr. SHEEHAN. We have made our share of mistakes.

Ms. BACKIEL. That is right. Exactly, we will do that, too. That will also happen.

Mr. HINOTE. Senator, partially in answer to your question, I am not sure that anybody has the answers now in terms of the complex question that you ask.

I think we are starting the process, and we have had 3, 4 or 5 years of experience of various agencies working in the public and private sector, but we are just starting the process to try to answer that direct question, I think, you asked.

Part of our problems here are jurisdictional. We have got the Federal, State, and local relationships here. We are taught to think in terms of that jurisdictional kind of thing. That is part of the problem.

Associated with that is the jurisdictional, organic acts laid upon the Federal agencies. There is a direct conflict, in many cases, between what the Forest Service does when they are adjacent to a national park.

The Park Service is concerned with, almost, total protection of everything up to that line right there. On the other side, the Forest Service is there. They allow hunting and fishing. They are there for multiple use. Who deals with that at the margin between these boundaries? We have got the same kind of conflicts existing between the public and private lands.

I am very glad to hear what Potlatch is doing out there because they are now beginning, obviously, with this kind of technology, and I think we can do it, but there is a big different, for example, in my territory or in my region between the people, their culture,

their types of trees, the water, of the mountains of southern Appalachia, which is in western North Carolina, and Nags Head, which is in eastern North Carolina.

We fund going from Fed to State and leave the States to implement, for example, the regulations of EPA. There are statewide regulations. They don't worry about the mountains, 2,000 feet and above. They deal all across the State. You have very different soil characteristics in dealing with things like septic tanks and eastern North Carolina than you do in western North Carolina.

So we have got to somehow or another deal with these interfaces or what us economists call dealing at the margins, and we have got to deal at the margins to deal with these issues. As long as it is an ecosystem that is within the boundary of the Forest Service, they can do very well with it, but if it crosses out and goes to these other jurisdictions, it becomes a very difficult problem, and we have somehow or another got to look at being able to do those interfaces, and there is no system in place that really does that, and that is what our institutional structure is attempting to try to do.

Senator DASCHLE. We are all grappling with the nebulous nature of all of this at this point. Obviously, at some point, we are going to have to put something on paper.

the Forest planning draft, rules are coming out. Do you anticipate that you will address this in the draft?

Mr. THOMAS. Yes. We have some things down on paper. It is not as nebulous as it might appear in conversation. We do have things on paper. We will address some of these issues of how we will start to achieve and accomplish these objectives.

I think our planning processes before were so plagued with being very precise that we ended up with very precise answers that didn't work very well.

Now, I am not sure that the answer to that is less precision, but we will have some things on paper, but it is going to take a while. It took us a long time to get to where we could write the National Forest Management Act in the planning regulations. It will take us, I hope, not as long to revise it, but we will have to revamp.

Senator DASCHLE. When do you expect that the proposed rules will be available for public review?

Mr. THOMAS. Summer.

Senator DASCHLE. Summer.

Mr. THOMAS. They are drafted. They are in the final massaging mode now.

Senator DASCHLE. 1994?

Mr. THOMAS. Yes.

Senator CRAIG. Kevin, in conversations I have had with you over what you are trying to do with your landscape approach toward management in this pilot program, I understand that the Forest Service feels that they have gone about as far as they can go in this cooperative project. What are the barriers they perceive which prevent a continuation or even an increased involvement, as you understand it?

Mr. BOLING. One of the first ones and a very real one, Senator, is the fact that we selected this rather small watershed, which was not in their normal planning process, and they were concerned about this being, kind of, off-budget and not part of their normal

program and also the fact that there was no hope in public involvement process in this partnership.

That is why they want to take it a step back now from what we have learned working together and to implement this on an actual planning process that has a beginning and has a final conclusion.

Just on some cultural issues that have surfaced, one person remarked one time. He said, "You know, we really would like to be able to be more innovative, but our laws and regulations and policies and forest plans and other things really don't allow us to be very innovative," and I think what is missing the most is an understanding by folks in the Forest Service about what their mission is today; that there is a vacuum in leadership that allows people to be comfortable with the decisions they make in order to carry them out without fear of retribution, and that needs to be fixed.

Senator DASCHLE. Does everybody agree with that? I see Dr. Thomas nodding his head yes, for the record.

Do you want to clarify your answer, Dr. Thomas?

Mr. THOMAS. I believe that we have given up what I consider, to some degree, our heritage to be the leading conservation agency of the United States and, I think, in the world.

I went to work for the Forest Service with the idea that that was what we did and that was our heritage, and I think we have slipped a little in that regard. I still think we are the finest conservation organization in the world.

We are working very hard and will proceed very quickly with doing everything we can to re-instill that mission and vision of leadership and natural resources management, and that we won't always play it safe. We will obey the law, but we will look for as much flexibility to be innovative and to be leaders as we possibly can, and if I think we need more slack, I will be back to see you.

Senator CRAIG. Speaking of slack, that was the context of my next question, in essence. Doing the pilots, building these cooperative relationships, if you will, at the ground level, are you at this time recognizing laws that bind you too much?

Now, when you say you won't break the law, I believe that. We all understand the consequence for doing that. Are you looking at a list of changes, adjustments in the law that would give you the kind of comfort zone you need to move in the direction you are proposing?

Mr. THOMAS. No, but I think we probably should.

One of the more difficult things in trying to obey the law is we are pledged to do that and do a better job, but you learn a lot by transgression and being jerked up short by the court of what that means, and then you have to adjust, but there are a lot of laws if you are managing the national forest. There are a lot of laws you have to comply with simultaneously, and sometimes we don't get them all to fit together right.

One of the things that is a very confusing situation now is the FACA. That is rather nebulous, and some of our people are even now afraid to consult with State foresters and game department cooperators in the States because that might be a FACA violation. I think that is too rigid an interpretation, but, nonetheless, we are a little confused about that right now, but I think it may be time to review all of the applicable legislation with which we have to

comply, not with the idea of evading anything, but the idea of how it might fit together better.

We have an incredible amount of litigation that we face, and we are doing a better and better job of winning that litigation, but it still takes a lot of time and it costs a lot of money, and we have to back up too much. I don't know that we are doing it, but I think it is something that needs to be done.

Mr. HINOTE. May I respond from a different end? As I mentioned earlier, we are down on the ground every day in contrast to the Chief being up here in Washington, and also corresponding to Mr. Boling.

I work with six different forest supervisors in southern Appalachia. They have changed over the 5 or 6 years I have been in this job, and I would like to say that I think most of them are doing a very good job and they are very easy to work with. You encounter different perceptions of those rules and regulations and so on, depending on which individual you are dealing with. In many cases, it depends on where they came from, the east coast or west coast, what problems they have seen, what schools they went to, or what forest they have been on in the past, but, all in all, I want to compliment the Forest Service on being able to work with them from the bottom up with those six forest supervisors I deal with in southern Appalachia.

Now, they have some problems in interpretation, though. The budgeting process, for example, they say that all of their budgets go into certain projects, and they don't have any flexibility. They interpret the rules as absolutely no flexibility for them to do things.

Then the other side is the Forest Service research side, which we haven't talked about here. They are much more rigorous in my area in interpreting the rules and doing it their way than the supervisors on the National Forest.

For example, we have some national programs where we are having some problems now with the research side of the Forest Service, where they say we have always sent the money to the States. The States don't like us not sending money to them. So we are not going to do anything different, for example, focus on a broad-based ecosystem that cuts across State boundaries, and we have six States where we are trying to get a consistent monitoring. It is hard for them to have that flexibility or interpret that they have that flexibility with the present system, and I think those are administrative rules. I don't think those are legal rules. Maybe I am wrong.

Ms. BACKIEL. Senators, let me respond in one aspect to Mr. Hinote's comments, and that is the budget. As you know, we are in the process of a budget reform, and we have requested in our 1995 budget a step in that reform. We do recognize our inflexibility, and we have asked for more flexibility in our budget.

I would ask that you take a look at that. In fact, I believe that we will be coming up to you, and we will be having a congressional briefing, I believe, on the budget reform process. We have some of your staffs already on that process, also.

Let me also say, with the same breath, that we do recognize that with budget reform—with that which we are asking for—is a reduction in our line-item appropriations, we recognize that with that

comes accountability and responsibility, and with that, as part of our budget reform process, we are also including, also in response to other laws and requests in regulations that we have to abide by, development of better outcome measures and performance measures for what we do and how we do it and the conditions of the resource that we steward.

So we are trying to address some of those, Mr. Hinote, and we can only do that with your help.

Mr. HINOTE. I might add an addendum to that, if I might, as well. I find in some cases you are more flexible than some of the other Federal agencies I deal with.

Ms. BACKIEL. That is amazing.

Mr. HINOTE. So it is not just the Forest Service.

Ms. BACKIEL. That is quite amazing. We have 72 line-item appropriations. I thought that was probably one of the highest. I might be wrong.

Mr. HINOTE. That may be the largest number, but there is an interpretation question.

Thank you.

Senator CRAIG. How do you plan to deal, then, as we move into this idea, Chief Thomas, a top-down edict or proposal?

Let me use a very real and specific example that really twists things around out in the Pacific Northwest and causes great frustration. It's called Pacfish. National Marine Fisheries as imposed Pacfish over the top of the management of the Pacific Northwest Forests. This agency steps right in and says, "We are sorry, but your forest plans are not what they ought to be, and we are just going to take 25 percent or 30 percent of your timber base away from you." How do we deal with that?

Mr. THOMAS. I hate to say this, but you are just letting me off the hook, but National Marine Fisheries Service didn't do that.

Senator CRAIG. OK. My mistake. I thought that was a collaborated effort in which they came up with it.

Mr. THOMAS. Well, it was a collaborative effort, and we did have listed fish, and it was very obvious that, as we began to consult on individual projects—

Senator CRAIG. But it was ultimately the Forest Service?

Mr. THOMAS. It was ultimately the Forest Service and the Bureau of Land Management. We did consult with NMFS to make sure that if we did this, it would head off the continuous refereeing of individual projects. That was Forest Service BLM response to the situation that existed.

That is why we hold out great hope for ecosystem management in the sense, Senator, we knew we were in trouble on anathemas fish for a very long period of time. If we had reacted earlier and more positively, 10, 15 years ago, we could have done it with much less effect.

The same thing would apply to the spotted owl and the old-growth questions. We knew they were coming 15 years ago. If we had responded then, we could have come up with applications that I am certain that we could have instituted at much less cost, but when you run out your options, then you get slam-dunked when you fail, and you slip over the line and get the species listed. Then,

according to the law, we have to respond with recovery plans to each of those individual species.

Our move in the Pacific Northwest, as dramatic as it is, is a dramatic attempt to try to avoid having to deal with a whole series of species that are listed, one after the other, where you have to go back and do a recovery plan and lay it in on top of what is already there.

You certainly have it right that it is a problem, but the Forest Service and BLM did that.

Senator CRAIG. OK. I appreciate the correction there. Then let me carry it a thought further. How does it fit in your definition of ecosystem management? Because it still appears to me to have been a top-down decision. Are you simply saying the time was such that we had to make it that way?

Mr. THOMAS. The time was such that, as we consulted on individual projects within the Columbian Basin, and it is fairly obvious we are going to get individual listings, that as we dealt with individual projects, we were merely going to have something very akin to Pacfish instituted in the piecemeal basis. Therefore, it was our decision that it, as an interim, it was better to go ahead and face up to the issue, go ahead with full assessment of the basin, to then come with a fully coordinated ecosystem strategy plan, but in the interim, it was in our mind, and still in my mind is, that it was better to move that way than to deal with individual continuous consultation on individual projects that would have led, essentially, to the same situation. It was better to face it in an interim strategy.

Now, if we did it on an individual process, the ruling was a red light to management. If we do it under the rules of Pacfish, it is a yellow light which says those buffers are there, you should be cautious, do the assessments, and then adjust. So we looked at Pacfish as a yellow light as opposed to a red light on every individual project. I still think it is the logical, rational thing to do, though expensive.

Senator DASCHLE. I am still trying to get a better definitional understanding today, and I would like to go back to something that is references from time to time, and that is forest health.

I would like, if somebody could help me, to describe what forest health is today, and the extent to which ecosystem management can allow us the achievement of forest health, they are connected, but, first, the definition, if somebody cares to suggest one, and second, the relationship.

Mr. THOMAS. I have been talking too much. Does somebody else want to?

Mr. BOLING. I will volunteer a wildlife biologist.

Senator DASCHLE. OK. He is real excited about this. I can see it. Why don't you, again, just introduce yourself.

Mr. WALL. I am Bill Wall of the Potlatch Corporation.

Senator DASCHLE. I am sorry?

Mr. WALL. Bill Wall with the Potlatch Corporation.

Senator DASCHLE. OK.

Mr. WALL. Every ecosystem, obviously, had different parameters and different conditions that exist, and currently, a lot of forests

in the West or, perhaps, outside of some of those ranges of historical conditions that we considered as healthy, what we have seen is the elimination of fire, and we have seen our forests move into a condition where, one, we have species, tree species off site and not doing as well off site, and two, a fuel-loading condition that is extremely high. So I am relating this to conditions that we have in the inner mountain Northwest, and Dr. Thomas is very familiar with some of these issues on the Boise Forest and over in north-eastern Oregon.

Because of those conditions, we are seeing a situation where a lot of different diseases and insect infestations are causing a tremendous amount of trees to die simultaneously, again building a lot more fuel loading. So what we see is a situation where catastrophic fire, rather than historical fire patterns that we had, we are now set up for those.

We feel like the key to getting back to a healthy situation is through management reintroduction of fire where possible, but it is going to take some manipulation of those forest stands to put them back into conditions that are essentially healthy.

From a wildlife standpoint, dead wood is extremely important in the forest. The idea of eliminating all dead wood would not be an appropriate strategy underneath an ecosystem management approach, by any means, either standing or down on the floor of the forest.

Let me back up and say, also, within the ecosystem context, fire, death through insect, and disease is also a natural condition within the forest, but based on some of the things we have seen across our area—and a really good example of that is to look at the photographs that we compared. That is a very small scale, but it demonstrates some of the difference of historical patterns versus where we are now.

I have given you some examples, but to define specifically what a healthy forest is, I think it is some of the goals that we are trying to do through the whole concept of developing ecosystem management. So I am not sure I addressed it specifically, but there are some general views on it, anyway.

Senator DASCHLE. I think this demonstrates that forest health isn't easy to define. You have given your best shot at it. I don't know how one condenses that in a succinct way that clarifies the term.

Mr. SHEEHAN. Let me give you a succinct way where I am.

Senator DASCHLE. OK.

Mr. SHEEHAN. In the California spotted owl report, which came out and has restricted what has gone on in the Sierra, the author of the report said that because of the natural occurring fires and the Native Americans burning the understory, when the Europeans came to the Sierra, you could gallop a horse through the woods. You can't now. The white fir is jack-strawed through bugs and drought. So, whenever it is a fire, it becomes something, instead of taking 10 people to put it out, it takes 1,000 people to put it out. You have to get on that problem, and that is what we are talking about when we are talking about forest health. Our community is burning down. Our forests are burning down because of the conditions of fire suppression and drought.

Mr. THOMAS. I think I could help clarify this a little bit. Through an analogy, 59 years old, I go in and take my physical, and the doctor says, "Well, you have got a little high blood pressure, and you could drop a few pounds, but, basically, you are in pretty good shape for the shape you are in," and I said, "That is great, Doc, because I am going to go run the Boston Marathon." He said, "Hold it. You ain't that healthy." So the problem of it is: Healthy for what?

For example, as we said, bugs come and go. These are all very natural things. In some cases, that is fine if we just want to watch those happen. However, if we expect some productivity from those forests, in some places, a lot of productivity, then health becomes defined in a different way. Healthy enough to do what or healthy enough to protect from what?

Now, the point being is in Idaho, when we had the foothill fires, with that much fuel loading, those sites had burned, God knows how many hundred times in history, but with not much intensity, but with enough fuel loading, some of those sites burned so hot that it, essentially, fried the soil, and it will be a very, very long time before that soil recovers.

Now, our biggest problem in trying to deal with those inner mountain situation where we have heavy fuel loading is how to reduce the fuel loading. We might agree that we want to reintroduce control fire. How to reduce the fuel loading to a sufficient extent that we can take the risk on purposeful introduction of fire? That is going to require some kind of mechanical process of removal, should we choose to take it on, and then we start to argue, and that is legitimate, but, again, I want you to keep in mind in forest health, it is healthy enough for what.

Senator DASCHLE. Mr. Hinote?

Mr. HINOTE. That is a good point. If I had more time—I know we have to close here very quickly. We recently sponsored three seminars throughout southern Appalachia of threats of forest health in the southern Appalachians. I did not insert this for the record, but I would be glad to leave some for the record.³

Senator DASCHLE. Very good.

Mr. HINOTE. I have four or five copies, but, very quickly, let me give you a couple of examples of what happened.

The American chestnut is now gone. We don't have the American chestnut anymore. What replaced that was the oak. Now we have got the oak having a problem with oak decline, gypsy moth. It is coming South here in our area. Not only that, but our dogwood is under stress. I left a postscript for some of you—for you, Senator—in terms of dogwood anthracnose, to fungus affecting the dogwood. You have got the spruce fir ecosystem. The entire elevation of southern Appalachians is just about gone.

We can paint a doom-and-gloom picture. What we are trying to say is the ecosystem, the landscape is changing out there. It is changing an awful lot as a result of a lot of exotic things coming in. The Forest, again, as the Chief said, depends—healthy for what? You can paint a gloom-and-doom picture out there in the southern Appalachians and the east coast, and I think we have to be very

³ Retained in Committee files.

careful about doing that, and we need to be looking at history and knowing that things will change. So we have got to keep that in mind as we go forward as well.

Senator DASCHLE. Senator Craig had one last question, I think, before we close the hearing.

Senator CRAIG. Mr. Aplet, through the decade of the 1960s and 1970s, interest groups decided that the way to protect the environment, because of their frustration over the way the Forest Service was managing it, was to come up with schemes like the National Wilderness Act. That is called preservation, and you and I and everybody else has been caught up in the argument and the politics of that since 1963.

One of my frustrations today in trying to understand ecosystem management concerns the Forest planning process that has identified certain areas to be classified as wilderness that, by definition, say no management. Yet, the Forest health analysis of some of those unroaded areas, because of our ability to suppress fire over the last several decades, shows a very real forest health problem. I am talking to scientists that tell me that, "If you lock it up, Senator, you doom it. It will die unless you get in there and manipulate it in some ways."

How do we deal with the question of preservation while addressing the Forest health problem?

Mr. APLET. I really don't see what we have been discussing here around the table to be inconsistent with our concerns at The Wilderness Society.

With respect to wilderness areas, *per se*, they are subject to management. There is quite a bit of management that can occur within wilderness with respect to the management of recreation and prescribed fire.

Senator CRAIG. No, no. I am talking about taking a chain saw in and dropping some trees and changing population of trees on land and unloading a fuel-loading base out there that is going to create a cataclysmic fire. The law won't let me do that.

Mr. APLET. The law will allow—I am not an authority on the Wilderness Act—

Senator CRAIG. Oh, OK.

Mr. APLET. —but I do understand that ecological restoration is allowable in wilderness.

With regard to the use of chain saws, I don't know. I suspect that timber sales, *per se*, is not something that is normally associated with wilderness areas, but I think that what The Wilderness Society was trying to achieve through the passage of the Wilderness Act and further wilderness bills was the maintenance of the long-term health of the ecosystem.

We have now reached a point in some places where it appears that ecological restoration is appropriate. What we need to do, before we go targeting specific areas, is to assess the large landscape scale, assess the threats, and come up with a reasonable prioritization schedule for treatment, and that is what I see lacking in the current discussion of forest health in the inland West.

Hopefully, it will be addressed by the Eastside Ecosystem Management Project, but I don't see wilderness designation be inconsistent with the long-term health of the Forest. Indeed, I believe

that the further designation of reserves going to be an essential part of ecosystem management.

Senator DASCHLE. We are going to have to make that the last word.

I want to thank all of our witnesses for your participation. These hearings are extremely helpful and informative for Senator Craig and I and, I am sure, for the balance of the committee when the record can be shown.

We thank you for coming, and with that, the hearing stands adjourned.

[Whereupon, at 5:05 p.m., the subcommittee adjourned, subject to the call of the Chair.]

A P P E N D I X

PREPARED STATEMENTS

ADELA BACKIEL

Mr. Chairman, and Members of the subcommittee:

Thank you for the opportunity to share with you how we are implementing ecosystem management. I am accompanied by Dr. Jack Ward Thomas, Chief of the Forest Service, Coy Jemmett, Supervisor of the Prescott National Forest, and Bill Pell, Ecosystem Management Coordinator for the Ouachita National Forest.

At the November hearing, Dave Unger, Associate Chief of the Forest Service, explained how the Forest Service initiated a 2-year experiment in ecological approaches called "New Perspectives." It provided the groundwork for the Forest Service's Ecosystem Management strategy of June 1992.

We are now implementing this strategy which requires an understanding of the roles that ecosystem structure and composition play in determining resource productivity and sustainability.

I would like to highlight some of the key components of this strategy:

- Ecosystem management must be based on sound ecological principles;
- Ecosystem management is the integration of ecological, economic, and societal factors in order to maintain and enhance the quality of the environment to best meet our current and future needs;
- The quality of human life is tied to the quality of the ecosystems in which we live and the health of the environment is tied to the health of our economy;
- Agencies are to incorporate ecosystem management into their strategic planning and budget programs; and
- The Department will coordinate ecosystem management implementation with other departments, agencies, and bureaus within the Federal Government.

I believe the only way we will successfully implement ecosystem management is by the collaborative efforts of the employees, private citizens, interest groups, and our partners. We are committed to providing the leadership at the department level to ensure that both the Soil Conservation Service (SCS) and the Forest Service move forward in implementing ecosystem management.

SOIL CONSERVATION SERVICE (SCS)

I would like to briefly describe how the SCS is implementing ecosystem management.

The SCS is upgrading its service to its customers through "ecosystem-based assistance." This service blends the latest ecosystem science principles with sound

conservation fundamentals of previous years. It focuses on managing the natural systems and processes that sustain resources, and includes social, cultural, and economic considerations.

This assistance is provided through a collaborative approach, using tools such as the Coordinated Resource Management process, a formal problem solving, consensus-building process involving all concerned participants.

An example is the Malpai-Borderlands Group, a coalition of 36 ranchers in southeastern Arizona and southwestern New Mexico. With the assistance of the SCS, they are developing a plan to restore and protect over 1 million acres of rangeland. The resource concerns include threatened and endangered plant and animal species, the need for improved rangeland diversity, and water quality and soil erosion concerns. Economic viability of the livestock industry is also extremely important because if the ranchers cannot make a living on their land, they could subdivide a largely intact rangeland ecosystem for recreational homes.

The SCS is providing assistance to the ranchers for rangeland and soil conservation, livestock management, and water quality and wildlife habitat improvement. SCS is also participating in several research projects. Because many of the ranchers are Federal land permittees, the Forest Service and Bureau of Land Management are cooperators in the project. In addition, some of the innovative ideas that are being adopted for this project includes the use of "grass banks" which are grasslands set aside for use when other pastures are being rehabilitated.

COOPERATION WITH PRIVATE LAND OWNERS

Although ecosystems cross political boundaries between land owners, we respect the sensitivity of private property rights. Both the Soil Conservation Service (SCS) and the Forest Service assistance to State or private land owners has always been at the request of the land owner. The agencies then may provide technical or financial assistance, if available, depending on what is needed and desired by the land owner.

Several of the examples we will discuss today include private land owners who have voluntarily asked for the assistance of the SCS or Forest Service. We strongly support this voluntary approach to encourage the participation of private land owners in an ecosystem management assessment. We have been very successful with this approach and there are no plans to change this direction. In fact, we believe this partnership approach encourages innovative management alternatives that result in better management.

SUMMARY

Ecosystem management is changing the philosophy of how the Forest Service and SCS and their partners are viewing our role in conservation. This change should not be viewed as abandoning or condemning past actions.

As both agencies complete broadscale assessments and on-the-ground projects, we will monitor these efforts to evaluate our management strategies, and where necessary, adapt our management to incorporate new information from the scientific community and the public.

The ultimate success of ecosystem management—management that recognizes that people are an integral part of the ecosystem and their needs must be blended with environmental concerns—will depend on how we focus our scientific inquiry and apply science to management.

Mr. Chairman, this completes my prepared statement. Dr. Jack Ward Thomas, Chief of the Forest Service, will now discuss some examples of how the Forest Service is implementing ecosystem management.

JACK WARD THOMAS

Thank you for the opportunity to offer my views on how the Forest Service is implementing ecosystem management. I am accompanied by William Pell, Ecosystem Management Coordinator for the Ouachita National Forest and Coy Jemmet, Forest Supervisor of the Prescott National Forest.

FOREST SERVICE IMPLEMENTATION

In February, I issued a national action plan for implementing ecosystem management. The goals of the action plan are:

1. Adopt an ecosystem management approach throughout the Agency;

2. Integrate ecosystem management into all activities;
3. Strengthen collaboration and innovation; and,
4. Ensure our management actions are ecologically responsible, economically viable, and socially acceptable.

This action plan represents the commitment of the Forest Service to shift from the testing and demonstration phase to full implementation of ecosystem management agencywide.

As an ecologist, I have spent much of my career studying ecosystems and how they work. These systems are incredibly complex, and we will never understand them completely. However, we have no option but to continue to move forward in natural resource management on the basis of what we know or think we know.

I view ecosystem management as a concept that describes a land ethic that will provide goods and services at a sustainable level for all resources, including timber harvest. We need to quickly develop the tools to measure the health and vigor of our forests and rangelands and the plant and animal communities of which ecosystems are composed. We need to implement management strategies that truly conserve biodiversity and maintain aesthetic values, while producing needed commodities, and we must do more than change labels, we must change actual management.

I would now like to take a few minutes to discuss some examples of how we are implementing ecosystem management at the project level.

LANDSCAPE ASSESSMENTS

The implementation of ecosystem management requires looking at a landscape scale to understand how ecosystems function before we can determine how best to manage them.

An example of a landscape scale assessment that will evaluate how an ecosystem functions is the Southern Appalachian Man and the Biosphere Program (SAMAB). Hubert Hinote, the Executive Director of SAMAB, will discuss the activities of SAMAB in his testimony. I want to add that the Forest Service is an active participant in this effort.

Another example of a landscape assessment in the Southeast is the Forest Service's Southern Appalachian Sub-Regional Assessment initiated in February 1994. The assessment is a coordination of Land and Resource Management Plans for six national forests in the southern Appalachians.

The assessment will not replace the Forest plan revision process, but will be used to provide a consistent ecological and social approach to managing these forests.

During the assessment, each forest will collect and update information, complete their Geographic Information System (GIS), and identify needed changes in management direction.

The assessment will also include coordination with local, State, and other Federal agencies and cooperating private land owners.

After completion of these landscape assessments, individual projects will be implemented at the field level.

PROJECT LEVEL IMPLEMENTATION OF ECOSYSTEM MANAGEMENT

We initiated many individual projects at the field level of the Agency during the "New Perspectives" phase of ecosystem management and using forest plan standards and guidelines. I will now discuss some of the projects we have implemented.

WHITE RIVER ECOSYSTEM INITIATIVE

In 1987, the Green Mountain National Forest in Vermont began a project to return Atlantic salmon to the White River. Centuries of farming and stream channelization have resulted in degraded trout and salmon habitat.

To begin to correct this situation, fish habitat and riparian area improvement projects were completed on National Forest System lands. These improvements were part of the desired future condition for streams and fish identified in the Green Mountain National Forest Plan.

The Forest signed a memorandum of understanding with an adjacent land owner to continue the habitat improvement projects on private lands and is cooperating with the State fish and game and U.S. Fish and Wildlife Service in restocking and monitoring salmon.

Other work has included trail construction to improve public access to the White River, placement of fishing piers for the mobility impaired, and parking area reconstruction to allow safe use of the area by Forest visitors.

KIRTLAND'S WARBLER RECOVERY PLAN

The Kirtland's Warbler Recovery Plan for the Huron-Manistee National Forest in Michigan calls for regenerating jack pine habitat through timber harvest and prescribed burning. However, these efforts have not always produced the dense jack pine stands rehired by the warbler.

In an effort to increase habitat establishment, the Forest Service has established partnerships with private and corporate groups to cost share planting the high-density jack pine stands rehired by the warbler.

The State Department of Natural Resources and the Forest have cooperated with the local community to provide access to birdwatchers who want to see the warbler. This has benefited the local economy by allowing the local community motels to place ads in birding magazines advertising their proximity to the warbler and that access is available to the warbler's habitat.

CICERO/FRENCH CREEK HABITAT RECOVERY PROJECT

In September 1990, the Swedlund wildfire burned 14,000 acres in the Cicero/French Creek area of the Black Hills National Forest. The area was a near monoculture of overstocked stands of Ponderosa Pine caused by years of fire suppression. The historic open, grassy areas were limited due to the invasion of Ponderosa Pine and lower French Creek had been altered to a shallow, wide stream that required annual stocking of trout.

An interdisciplinary team of government and private individuals approached the restoration by establishing historic and sustainable conditions for the area. The team reviewed information about the historic setting for the Black Hills.

The recovery effort included partnerships and funding assistance from the 27 private land owners in the Cicero/French Creek area, Custer County Conservation District, SCS, and the State game and fish department.

Examples of projects that have been implemented include: revegetation using native grass, shrub, and tree seeds; fishery habitat improvement projects to control erosion and increase stream shading; deferred cattle grazing; and salvage logging to reduce fire risk.

Two years of monitoring show a more diverse species of vegetation within the area, growth rates of grasses and shrubs is exceptional, and fish surveys show trout are now spawning naturally in the restored stream gravel.

OUACHITA MOUNTAINS ECOSYSTEM MANAGEMENT PROJECT

The Ouachita Mountains Ecosystem Management Project on the Ouachita National Forest in Arkansas is a coordinated effort between research and management.

The first research projects were designed to experiment with timber harvest techniques and natural regeneration that can be used as alternatives to clear cutting and planting. After project completion, research is monitoring the large-scale ecosystem responses to these alternative management approaches. The project is being implemented through the cooperation of 2 national forests, 2 research stations, and 10 universities.

The project is directed at sustainable ecosystem management—the ability to achieve and sustain desired ecosystem conditions and resource values. Elements under study include mixed-species stand dynamics, forest growth and yield, plant biodiversity (including emphasis on herbaceous plants), soil, and litter nutrients, soil compaction and disturbance, stream morphology and woody debris deposition, small mammals, and neotropical migrant birds.

The project is an example of bringing Forest Service research and management together to assess current management strategies and where the results can be immediately applied to Forest activities.

YAVAPAI ECOSYSTEM PROJECT

On the Prescott National Forest, the 110,000-acre Yavapai Project Area, includes a privately-owned ranch in an intermingled, checkerboard pattern. Before the project was initiated, the rangeland conditions did not meet Forest Plan standards and guidelines. Pinyon and juniper trees were invading the grasslands and sheet erosion was washing away the topsoil. The ranch owners asked the Forest Service to start a process that would integrate resource use, including livestock grazing.

The Forest established partnerships with county, State, and other Federal agencies, the University of Arizona, Arizona State University, and local interest groups. The vegetation and soils were mapped by the Forest Service and SCS and a wildlife research project has been initiated by the Forest and Arizona State University.

Public involvement included numerous public meetings, a public opinion survey, and direct contact with industry and environmental groups.

After analyzing the data and public comments, the team, which included cooperating groups, developed a "coordinated resource management" approach in which livestock grazing is planned to meet objectives for wildlife habitat, water and soil protection, and vegetation management.

The completed plan is being funded by the Forest Service and the State of Arizona with matching funding provided by the rancher.

SUMMARY

I want to close by saying that ecosystem management is a statement of how the Forest Service will maintain a sustainable supply of goods and services from National Forest System lands. As Deputy Assistant Secretary Backiel mentioned earlier, this change should not be taken by anyone as abandoning or condemning our past actions. We want to build on the past and incorporate the new information we are learning.

We will continue to experiment with implementation of ecosystem management, and these first projects demonstrate the need for additional information and analysis, as well as point out ways to do a more effective and efficient job.

We will continue to use our State and Private Forestry staff to provide technical and financial assistance to other land owners, including rural community assistance. All the programs remain voluntary and actual decisions are left to the land owner.

Mr. Chairman, this completes my prepared statement. We will be pleased to respond to any questions you may have.

HUBERT HINOTE

It is a pleasure and privilege to appear before you today to describe the ways in which the Southern Appalachian Man and the Biosphere Program, called SAMAB for short, is implementing ecosystem management principles in Southern Appalachia.

The main focus of this testimony is on what SAMAB is currently doing and what it hopes to do in the near future, but first, it may be helpful to explain how the SAMAB Program came into being, what its mission is, and what its objectives are. (Attachment 1⁴ provides more background information on the concept of biosphere reserves and the formation of SAMAB.)

BACKGROUND

SAMAB began in late 1988, when six Federal agencies that have land-management responsibilities in the Southeastern United States signed an interagency and cooperative agreement that created the SAMAB Cooperative. (Table 1 contains the statement of work.) The charter members were the Forest Service, the National Park Service, the Tennessee Valley Authority, the Fish and Wildlife Service, the Department of Energy's Oak Ridge National Laboratory, and the Economic Development Administration.

The original partnership has grown steadily. The Environmental Protection Agency and the U.S. Geological Survey later signed the agreement, and so did the States of North Carolina and Georgia. The newly established National Biological Survey of the Department of Interior and the State of Tennessee are expected to join soon. The Appalachian Regional Commission, the Army Corps of Engineers, and the States of Alabama and Virginia are considering joining.

The United States Man and Biosphere (USMAB) Program recognized SAMAB as a regional demonstration model for other biosphere reserves across the country in 1990.

In order to provide private-sector involvement in and support for the SAMAB program, a nonprofit SAMAB Foundation was chartered in 1990 and was subsequently granted 501c (3) status by the IRS.

The SAMAB program is governed by the Cooperative's Executive Committee—made up of one representative of each of the Federal and State member agencies—and the Foundation Board of Directors.

⁴ See page 53.

TABLE 1.

INTERAGENCY AND COOPERATIVE AGREEMENT FOR THE ESTABLISHMENT AND OPERATION OF THE SOUTHERN APPALACHIAN MAN AND THE BIOSPHERE COOPERATIVE

ARTICLE II. STATEMENT OF WORK

(1) Establish a Southern Appalachian Man and the Biosphere Cooperative (SAMAB). The cooperative shall be managed and directed through an executive committee comprised of one representative from each party to this agreement. The executive committee shall establish program policies consistent with the cooperative's objectives.

(2) Cooperate with regional, State, and local governments, individuals, and other interested organizations to develop a land ethic that recognizes the importance of ecologically sound management of natural and cultural resources.

(3) Identify principal environmental and developmental issues related to the objectives of the cooperative. This will be accomplished through a series of conferences and meetings with interested groups and individuals.

(4) Undertake an ongoing and comprehensive effort to identify long-term, sustainable, and ecologically sound economic development opportunities.

(5) Undertake cooperative research and resource management initiatives which are regional in scope and disseminate resulting information from these activities.

(6) Develop and implement a voluntary environmental education program with the public school systems of the region and with other interested organizations.

(7) Establish cooperative relationships with State, local, and other Federal entities within the region.

(8) Procure and disseminate informational materials appropriate to this project.

(9) Empower the executive committee to establish a Southern Appalachian Biosphere Coordinating Office which can provide the expertise and labor to carry out the functions desired by the parties to this agreement.

Six operating committees, staffed by technical experts from the member agencies, do most of SAMAB's work, enlisting the aid of other specialists from the member agencies. These committees are: Environmental Research and Monitoring, Sustainable Development, Environmental Education, Conservation and Training, Resource Management, Public Affairs, and Cultural and Historic Resources. (Figure 1 reflects the present organizational structure of the SAMAB program).⁵

With this extensive level of membership and diversity of interests, SAMAB complies with its stated mission, which is:

. . . to foster harmonious relationships between humans and their environment through programs and projects that integrate the social, physical, and biological sciences to address actual problems."

Southern Appalachia is one of the many Man and the Biosphere Reserves designated as such by the United Nations Educational, Scientific and Cultural Organization (UNESCO), but the SAMAB program is the only regional program recognized by both UNESCO and the USMAB. At the heart of the regional program is one or more Biosphere Reserve Management Units. Biosphere Reserve Management Units typically are specific geographical areas that are shielded from the influence of unbridled development. Lessons learned in these areas can be used to reach out and influence the surrounding region.

The SAMAB program started with two Biosphere Reserve Management Units, now has five, and expects to add three more in the near future.

The Biosphere Reserve Management Units currently are the Great Smoky Mountains National Park; the Department of Energy's Oak Ridge National Environmental Research Park; the Coweeta Hydrologic Laboratory of the USDA Forest Service; Mount Mitchell State Park, which is operated by the State of North Carolina; and Grandfather Mountain, a privately operated environmental park which is also in North Carolina. These are all recognized by UNESCO as a part of its international network of biosphere reserves. (As of March 1994, UNESCO had designated 323 biosphere reserves in 83 countries, including Southern Appalachia and 46 others in the United States, the majority of which are national parks.)

⁵ See page 51.

SAMAB's research, education, and demonstration programs in ecosystem management center on these Biosphere Reserve Management Units but extend outward in a zone of cooperation that embraces some 50,000 square miles in six States: North Carolina, Tennessee, Virginia, South Carolina, Alabama, and Georgia. (Figure 2 shows the SAMAB Zone of Cooperation.)⁶

This extensive zone of cooperation was not chosen arbitrarily. It was identified because it shares common geological, biological, and cultural resources, and because of administrative factors, mainly the fact that it lies within the administrative boundaries of the southeastern offices of the various Federal agencies in the SAMAB Cooperative.

Within this zone is found a unique mixture of scenic beauty, rich biodiversity, traditional mountain cultures, and modern development. The Region contains many national and State parks and recreational areas, national and State forests, experimental research forests, Cherokee Indian tribal lands, and reservoirs with associated recreational areas that are operated by the Tennessee Valley Authority and by private utilities.

In the SAMAB region, there has been a continuing lively interchange of views as to what really constitutes an ecosystem and what is involved in sound ecosystem management. These words convey different meanings to different people, just as do other popular terms such as global change, biodiversity, and sustainable development.

Nevertheless, SAMAB feels that its extensive zone of cooperation can truly be viewed as one large ecosystem.

Two other points should be made about the SAMAB program.

One is this: The present SAMAB organization did not appear suddenly in full bloom but developed over time as it gained experience. It is still developing, as will be demonstrated later in this testimony.

The other point is: Everything SAMAB has accomplished has been done without any "new" money in the Federal budget. The regional offices of the agencies themselves, recognizing the value of pooling their resources, have sustained SAMAB thus far.

The Tennessee Valley Authority and Great Smoky Mountains National Park were especially supportive in the formative years. The Park provides office space and related services to the executive director, and TVA took the lead by assigning one of its employees to fill the office of executive director and by providing administrative, legal, and financial assistance to the Cooperative.

CURRENT ACTIVITIES

All the above is background. The question I'm sure this committee would like answered is: How has SAMAB fulfilled its mission in ways that employ ecosystem management principles in its various programs and projects?

I will give you just three examples. (For other examples, See Table 2.)

TABLE 2.

ADDITIONAL PROGRAM PROJECT (BY GENERAL SUBJECT AREA)

Public Information and Education

- General information on MAB, SAMAB, the Region
- Newsletter
- Conferences, workshops
 - Annual conference
 - Air quality
 - Threats to forests

Environment Monitoring and Assessment

- Forest health monitoring
- Landscape ecology/landscape indicators

⁶See page 52.

Sustainable Development

- Community planning/tourism
- Workshops on sustainable development

Biodiversity and Landscape Management

- Management Units of Southern Appalachian Biosphere Reserve
- Geographic Information Systems
- Forestry best management practices
- Wetlands
- Use(s) of native plants
- Native brook trout

Ecosystem Management

- Watershed management strategies
- Neotropical migratory birds
- Air quality management (threats to Class 1 airsheds)

Environmental Education and Training

- Directory of Environmental Education and Training
- Threatened and endangered species (reintroduction of red wolf)
- Insects and diseases (dogwood anthracnose)
- Water ("From the Mountains to the Coast", a video production)
- Special programs (Bent Creek Experimental Forest video production)

Cultural and Historical Resources

- Workshop(s)
- Databases

First, Air Quality: This is a major issue in the Southern Appalachians. In recent years, vegetation and water quality studies have shown that the acidity of cloud and fog moisture across the Southern Appalachians is inordinately high. scientists suggest that discharges from coal-fired power plants and from automobile exhausts are major contributing factors.

However, the issue is even more complex. It is known, for example, that pollutants from as far away as the heavily industrialized Ohio River Valley reach the Southern Appalachian mountains in significant amounts, contributing to acidic deposition.

In addition, the Region is affected by atmospheric ozone, which occurs at unusually high levels throughout the southeastern United States. Ozone and atmospheric deposition are having a major impact on the forest health of the Southern Appalachians, especially on old growth.

The beauty of the mountains is too often hidden by haze from these human sources, and this is a matter of great concern to the tourist industry and the general public. Visibility in Great Smoky Mountains National Park has declined up to 75 percent in the last 2 decades, due primarily to an increase in sulfates and other particulates in the air.

Great Smoky Mountains National Park is the most visited national park in the United States, and has been designated a Class 1 area, which means it is to be given the highest degree of protection possible under the Clean Air Act. There are five other Class 1 areas in the Region, all managed by the Forest Service. All of these areas suffer from the atmospheric phenomena described above.

Because of this problem, SAMAB sponsored a forum on air quality at Gatlinburg, Tennessee, in March 1992. It was the first time that such a variety of interested parties had been brought to one table for an exchange of information and viewpoints on this highly controversial issue.

About 125 persons from Federal and State agencies, State regulatory agencies, private industry, universities, and citizen groups participated. They represented a number of conflicting interests and the meeting became quite emotional at times.

Sessions went far past the allotted time, into the night, as participants vented their frustrations—but an amazing thing happened.

As emotions cooled, fresh, positive suggestions were heard for addressing this perplexing problem. It was agreed that more and better air quality monitoring is needed and that the States need to broaden their view and work more closely together.

because, after all, air pollution sources are found throughout the Region and this pollution crosses State lines.

As a direct result of that SAMAB conference, the State air quality regulatory agencies organized a regional partnership for collectively addressing air quality issues in Southern Appalachia. The new partnership is called the Southern Appalachian Mountain Initiative (SAMI).

This would not have happened had SAMAB not brought these people together.

SAMI is now fairly well organized and already has established two new air monitoring stations. Other agencies have established two more monitoring stations in coordination with the SAMI initiative.

Recognizing the value of this coordinated approach, EPA has already provided more than \$600,000 in support of the SAMI program.

Throughout this process, SAMAB has strengthened its position with the regulatory community. Today, it is represented on each of SAMAB's committees and technical groups.

Subsequent to the Gatlinburg conference, SAMAB, through its Public Affairs Committee, published an attractive color brochure explaining in lay terms the air quality problems affecting Southern Appalachia. Ten thousand copies were distributed.

In addition, the Forest Service and Park Service asked SAMAB to assist them in developing an air quality management plan for their lands in Southern Appalachia, and it is doing that.

A second area illustrating SAMAB's contribution to ecosystem management is: *Endangered species*.

When the Fish and Wildlife Service launched its program to reintroduce the red wolf into the Great Smoky Mountains National Park, that agency knew from experience that it could expect opposition from a fearful public that lacked an adequate understanding of these animals. Public education as to the true nature of the red wolf project was urgently needed.

SAMAB, through its Environmental Education Committee and in cooperation with the NBC television affiliate, WBIR-TV in Knoxville, Tennessee, developed a public education campaign that successfully diffused this controversy.

SAMAB sponsored a TV documentary, entitled "Front Runner," which later won an Emmy Award for excellence. It portrays the reintroduction of the red wolf into the Park and describes the habits of an endangered animal that shies from human contact and poses almost no threat to society.

WBIR-TV produced and aired the documentary and made it available for broadcast in several other locations. SAMAB prepared related materials, including a teachers guide and an attractive poster, that have been used in classrooms throughout the Region. This package of material was sent to all schools and public libraries in the SAMAB Zone of Cooperation. The Urban America organization listed the poster among the 20 best in the country in 1992.

As an aside, I'd like to tell you about a similar project not directly related to endangered species.

SAMAB tackled the challenging subject of combating dogwood anthracnose, an incurable disease that in the late 1980s began decimating stands of flowering dogwood trees in the Southern Appalachian region.

The flowering dogwood is especially treasured in the eastern United States and its cultivation and sale are a multi-million-dollar business. Dogwood festivals are common in major cities of the Southern Appalachians and bring in additional tourist and local-trade dollars.

The anthracnose scourge started in the Northeast and began steadily moving southward. The southern nursery industry was understandably fearful of publicity, but SAMAB felt the public needed to be alerted so protective steps could be taken.

SAMAB sponsored a series of three public information meetings and enlisted experts from the Park Service, Forest Service, regional universities and others to lay out the facts and to encourage support for research into the cause and possible cures for anthracnose.

Botanical scientists at this forum offered excellent advice for protecting dogwood trees in urban areas. Interestingly, they all agreed that one of the best strategies was to plant more and more dogwoods, something the nursery industry was glad to hear.

SAMAB published an educational brochure, which it initially distributed, but the Izaac Walton League was so impressed with it that they obtained funding for publishing and distributing 250,000 additional copies. SAMAB also produced and distributed a 7-minute educational video and an attractive poster encouraging dogwood protection.

SAMAB has sponsored similar educational materials dealing with water quality and forest health issues in our region.

The third major example of SAMAB's involvement in ecosystem management is its role in *community planning*.

This is a particularly challenging role for SAMAB because of the Region's culture, and I'm sure that people from other regions can identify with what I am about to say. The prevailing sentiment of Southern Appalachian people when it comes to anything related to land use planning is that "It's my land and I will do with it as I damn well please."

So there is a tradition of resistance to such things as community planning and zoning.

On the other hand, one of SAMAB's first successes was to demonstrate that communities can plan for growth in a way that protects the local ecosystem, including their natural resource base and cultural heritage, from development pressures—no easy task in a region where the lure of tourist dollars has led in some cases to unbridled development that has overtaxed the resources and resulted in a decline in the quality of life.

Perhaps you have heard of Pigeon Forge and Gatlinburg, Tennessee, the major gateway to the Great Smoky Mountains National Park, where this sort of development took place for many years.

You probably have not heard of Pittman Center, Tennessee, a small town near Gatlinburg that also is a gateway to the Park. The people in Pittman Center asked SAMAB to help it plan for future growth—growth that would protect its community character and its ecology and at the same time provide for economic growth and expansion.

What resulted was a model plan that in many ways is a practical, "living lesson" in ecosystem management.

Here briefly is what happened:

The townspeople, most of whom had lived there for many years, became concerned that Gatlinburg-type growth might swallow them up. They asked for SAMAB's help.

In cooperation with the University of Tennessee and with funding from the Economic Development Administration, we helped Pittman Center develop a strategic plan, which led to creation of further zoning ordinances which were implemented after extensive public involvement.

Thus, community planning turned out to be not such a repulsive concept after all. The town of Pittman Center adopted the following goal statement, which I believe you will find most interesting:

"To create and perpetuate a quality living environment and to encourage quality development that supports this end. To encourage development that supports a tourist-oriented economic base that relates to and magnifies our unique relation to and with the Great Smoky Mountains."

The story doesn't end at Pittman Center. A community development plan based upon the Pittman Center model was prepared with additional funding from the Economic Development Administration and was widely distributed to other communities. It has even been sent on request to communities in Canada and Asia.

Closer to home, the Pittman Center model plan is being used by the town of Townsend, Tennessee, which is another gateway to the Great Smoky Mountains National Park; in fact, it handles the third highest volume of traffic into the Park—1.5 million visitors last year alone.

Scores of other communities have received copies of the Pittman Center model plan.

I have focused on three major examples of SAMAB activity that illustrate ecosystem management principles. Without SAMAB, these things would not have happened—at least not in so timely a fashion or with such a broad-based approach that draws on the expertise of eight major Federal agencies, State agencies, and private interests.

FUTURE ACTIVITIES

Now I would like to tell you about our plans for the near future and a couple of new initiatives that we are very excited about. Our main objective now is to become more focused in our work. To that end, a framework has been developed to provide for the orderly identification and eventual solution of resource issues in Southern Appalachia. As a first step, we will this year begin to identify, catalogue and analyze all current activities in the Region that relate to the natural and socioeconomic resources. This will include activities carried on by non-SAMAB agencies.

We will also sponsor a Critical Issues Forum, expected to occur this summer, composed of SAMAB and non-SAMAB people representing national and regional policy-makers, Government agencies (State, Federal and local), industry, conservation, recreation, community leadership, and others. They will identify and prioritize the critical issues. This forum will identify gaps in programs and information as well as linkages with emerging national initiatives.

The results will be published and may be used for a number of purposes. SAMAB agencies can use them to analyze their own activities, especially as they develop their budget requests, and the SAMAB program will use them to determine what projects it needs to focus on.

Related to this effort, we are finishing a business plan for SAMAB that will help the program achieve sharper focus for the next 3 years. Under this plan, the three major goals are (1) to build upon SAMAB's past successes by integrating each member agency's resources to address common objectives; (2) to develop better communication ties with policy-makers, decision makers, and others who have a stake in what SAMAB does; and (3) to fine tune the SAMAB program in order to meet the needs of the stakeholders.

On goal number 1, to capitalize on SAMAB's past successes, one of the aims is to reduce resource/management conflicts in the Region even more and to facilitate greater cooperation in achieving common resource management and economic development goals.

For example, SAMAB, at the request of the Forest Service, will sponsor a public forum in late spring of this year where the Forest Service's plans for an ecosystem management demonstration project on the Chattooga River will be discussed. This demonstration project covers 160,000 acres in three States. It has generated a great deal of public interest, since the Chattooga is classified as a wild and scenic river. As a result of SAMAB participation, other Federal agencies are becoming actively involved in the Chattooga ecosystem.

On goal number 2, to improve communication with vital constituencies, we are developing a marketing plan to promote SAMAB within the Region and pursue linkages with major national initiatives such as the Interagency Task Force on Ecosystem Management, the NBS, the Council on Economic Sustainability, the movement to "reinvent government," and so forth.

In actuality, we are already ahead of our plan for reaching this goal and have established very effective linkages with the NBS, which, as stated earlier, is expected to join SAMAB soon. NBS recognizes the need for coordinated, large-scale, integrated solutions to ecosystem management problems of the Region; for example, the decline in fish and migratory bird populations, and air and water pollution involving private and public land ownerships.

On goal number 3, to fine tune the SAMAB program to better meet stakeholders' needs, we will, as outlined previously, undertake a process for identifying critical issues in the Region so that SAMAB can do a better job of targeting specific research and management projects.

SAMAB realized early on, of course, that it could not possibly tackle *every* problem confronting ecosystem managers. Despite our broad base of interagency support, SAMAB is quite limited. The executive director is, in fact, the only paid staff member. The Executive Committee and the Foundation Board provides direction and the executive director relies for support on the voluntary assistance of the scores of dedicated employees in the member agencies and among private-sector partners.

Gaining the trust and cooperation of these agencies and partners has taken time, but it has paid off in ever-increasing support.

In the formative years SAMAB was, quite frankly, opportunistic in selecting its targets. It aimed at projects that would get quick recognition and results and would build trust and confidence in SAMAB as an "honest broker" in balancing the Region's economic growth and ecological protection.

The SAMAB Program has succeeded beyond its dreams, and this has led to many, many demands for SAMAB involvement in problem solving within the Southern Appalachian region. In addition, as the first regional MAB program recognized by USMAB and UNESCO, it is frequently asked to assist in other regions of the United States and in the international arena.

Therefore SAMAB must have a system for keeping it focused; for identifying those critical issues that it must be involved in—and then developing long-term strategies for addressing them. The business plan and Critical Issues Forum are the first steps. A special committee of SAMAB members is developing an integrated assessment plan, the next step in the process. With it, SAMAB will focus on research and management projects that better represent the accepted principles of ecosystem management—projects that have national interest and support.

The SAMAB program is already receiving some attention in this regard. Some examples follow:

- NBS proposes to help SAMAB fund a 3-year integrated ecosystem assessment in Southern Appalachia. Among other things, NBS could help develop a much needed regional inventory of databases and a system for database sharing.
- The U.S. Geological Survey has ongoing National Water Quality Assessment (NAWQA) projects that will address critical issues and will be useful to ecosystem programs that are developed for Southern Appalachia.
- TVA, as a laboratory for "reinventing government," has adopted an ecosystem management approach in caring for its own resources. TVA has stated it will collaborate closely with the SAMAB program in implementing this approach.
- the Forest Service plans an integrated assessment of ecosystem management issues for the six national forests in the Southern Appalachians and has asked for SAMAB's collaboration in this effort.

All the above initiatives will be linked and supportive of one another within the Southern Appalachian ecosystem.

CONCLUSION

We are naturally very excited by all these developments and by the prospect of achieving an even more effective SAAB program, one that is clearly focused and capable of solving some of the major ecosystem management challenges facing our region and the Nation.

Mr. Chairman, this concludes the testimony on the SAMAB Program. Thank you again for allowing me to participate. I will be happy to provide additional information that you may need at a later date.

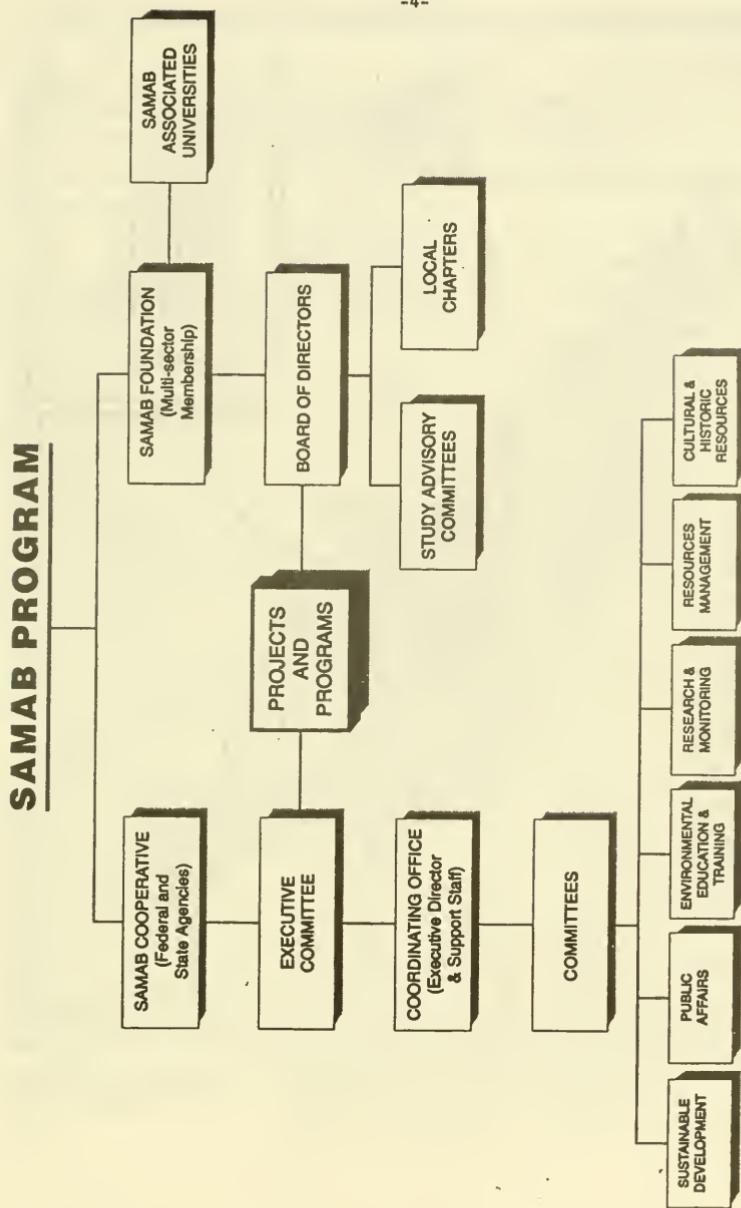
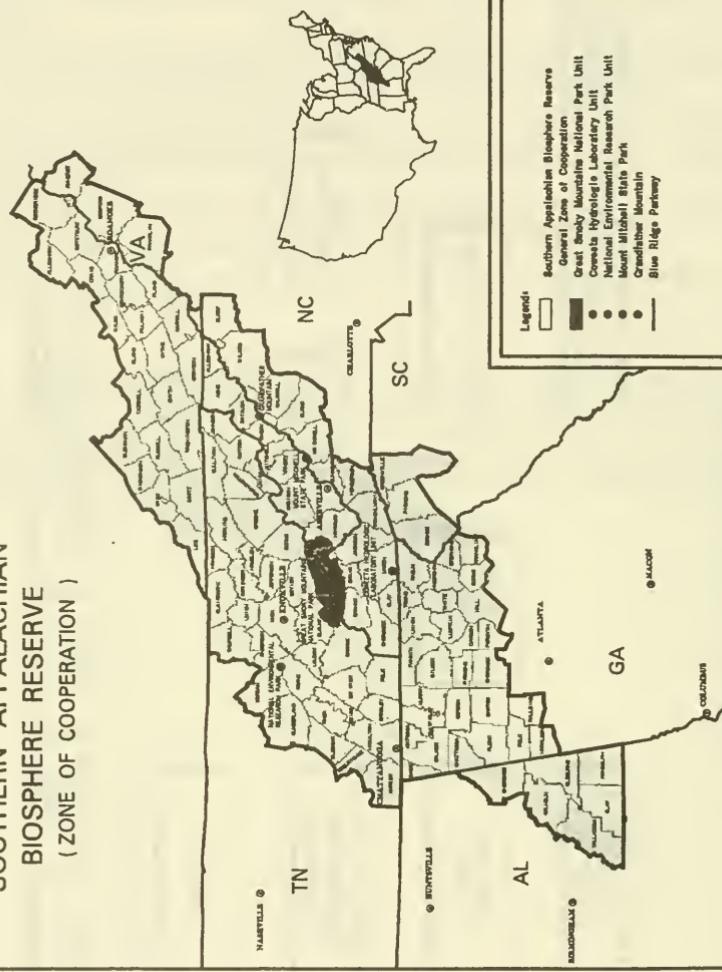


FIGURE 1.

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**SOUTHERN APPALACHIAN
BIOSPHERE RESERVE
(ZONE OF COOPERATION)**



Building Bioregional Institutions utilizing the MAB Framework: The Experience of the Southern Appalachian Man and the Biosphere (SAMAB) Program

by Hubert Hinote

Abstract

Biosphere Reserves can serve as an ideal mechanism for maintaining landscape diversity when an accompanying institutional structure is put in place. Regional Man and the Biosphere (MAB) Programs provide the aegis for cooperation among agencies, institutions, and organizations in developing the knowledge, skills, and attitudes to support a continuing program of integrating conservation of biodiversity and sustainable economic uses in a particular landscape.

The first section of this paper is directed to the evolution of the concept of biosphere reserves, and the second, to a discussion of the multiple role and functions of biosphere reserves. These two sections are intended to enhance the reader's understanding of the history, role, and functions of biosphere reserves.

The Southern Appalachian Biosphere Reserve is a multiple-unit biosphere reserve serving multiple roles and functions. One of the functions is maintaining landscape diversity through a system of zonation and providing an institutional framework for demonstrating the practical benefits of biosphere reserves.

The Southern Appalachian Man and the Biosphere Reserve (SAMAB) Program, established in August, 1988, is the first operational regional MAB Program in the United States. The program involves an inter-agency agreement establishing a Cooperative to coordinate the participation of federal and state agencies representing the science, conservation, and economic development sectors; the designation of permanent and ad hoc committees to plan and implement SAMAB research, education and demonstration projects; and the creation of a not-for-profit SAMAB Foundation to involve corporations, other non-government organizations, universities, and individuals.

Introduction: Evolution of the Concept of Biosphere Reserves (1)

The concept of biosphere reserves has emerged from UNESCO's Man and the Biosphere (MAB) Program. The MAB Program is probably the best known of the science programs of UNESCO. MAB's ambitious purpose is to enjoin the cooperation of science and society in establishing harmonious relationships between people and the environment.

MAB itself originated from a 1968 conference on the "Rational Use and Conservation of the Resources of the Biosphere". One of the recommendations of that conference dealt with the "utilization and preservation of genetic resources" and proposed to make specific efforts to preserve representative samples of significant ecosystems, original habitats of domesticated plants and animals and remnant populations of rare and endangered species. Another recommendation dealt with the "preservation of natural areas and endangered species" (2).

In 1969, when scientific consultations were being held to formulate the elements of the MAB Program, the idea emerged of "a coordinated worldwide network of national parks, biological reserves, and other protected areas" serving conservation as well as research and education needs. Because these multifunctional biological reserves were to be set up within the framework of the MAB Program, they occasionally were referred to as "biosphere reserves", but without a precise meaning or understanding of what the term meant.

In November 1970, the UNESCO General Conference initiated a "long-term intergovernmental and interdisciplinary program on Man and the Biosphere focusing on the general study of the structure and functioning of the biosphere and its ecological regions, on the systematic observation of the changes brought about by man in the biosphere and its resources, on the study of the overall effects of these changes on the human species itself, and on the education and information to be provided on these subjects". The conference invited UNESCO's member states to set up national committees for participation in the pro-

gram and established an International Coordinating Council to set policy and priorities.

When the International Coordinating Council met at its first session in November 1971, the MAB Program was focused around 13 research themes (a 14th theme was added later), with theme number 8 being identified as "Conservation of natural areas and the genetic material they contain" and spelling out the idea of a worldwide network of protected areas (3). Biosphere reserves were mentioned under this theme (theme number 8, and under this theme only) and were at the same time proposed "as basic logistic resources for research where experiments can be repeated in the same places over periods of time, as areas for education and training, and as essential components for the study of many projects under the programme". Thus the idea and the term "biosphere reserves" were officially launched but in a hazy manner, without much clarity about their role and nature.

One of the key recommendations at the 1972 United Nations Conference on the Human Environment at Stockholm was the establishment of a global network of protected areas that would conserve representative examples of the world's ecosystems. These areas would serve as benchmarks of environmental quality, help preserve gene pools, and provide a framework for international scientific cooperation. This recommendation gave a major boost to the development of biosphere reserves.

From 1973 through 1975, UNESCO, in cooperation with others, convened panels of experts to clarify the scientific mission of biosphere reserves and to set criteria for their selection. The association of the biosphere reserve concept with MAB theme 8 blurred everything but a conservation/protection role. In 1974 this bias was partly mitigated by a special task force convened by UNESCO and UNEP which drew up a set of objectives and a set of characteristics for biosphere reserves (4). The multiple functions of biosphere reserves covering three basic needs were indicated, namely:

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- (a) the need for reinforcing the conservation of genetic resources and ecosystems and the maintenance of biological diversity (conservation role),
- (b) the need for setting up a well-identified international network of areas directly related to MAB research and monitoring activities, including accompanying training and information exchange (logistic role),
- (c) the need to associate environmental protection and land resource development as a governing principle for research and education activities (development role).

It is obvious that these needs can be interpreted in different ways because they cover a wide variety of situations. Moreover, they are given without any hierarchical importance and provide no priorities for selections. A generalized zoning pattern, however, was proposed which was intended to combine the different interests of biosphere reserves. This zoning is shown, in an updated form, in Figure 1.

Also in 1974, UNESCO proposed an ambitious 6-year program to develop an international network. It soon became apparent that the United Nations organizations would be unable to fund this ambitious program; thus a bold measure was needed to maintain enthusiasm. This came in the form of a provision in the Nixon-Brezhnev Summit Communiqué of July 1974. In this communiqué, both sides agreed to support the implementation of MAB and to "designate in the territories of their respective countries certain natural areas as biosphere reserves for protecting valuable plant and animal genetic strains and ecosystems, and for conducting scientific research needed for more effective actions concerned with global protection". Following this communiqué, U.S. scientists worked to evaluate and name sites in time for the International Coordinating Council meeting in November 1974. At that time, the U.S. scientists' choice favored protected sites with a long history of experimental, ecological research under the Depart-

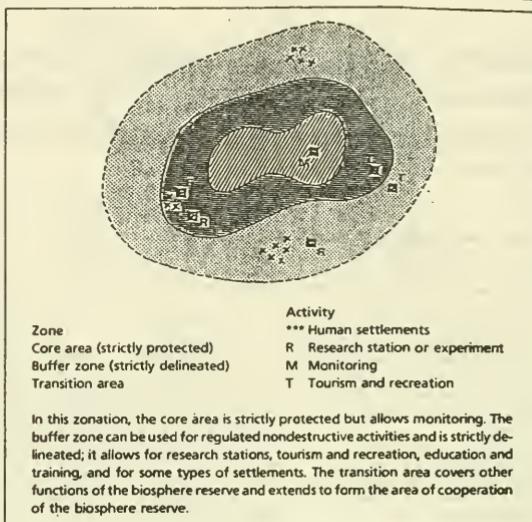


Figure 1: Zonation of biosphere reserve

ment of Agriculture, and large conservation areas, mostly managed by the National Park Service. During the next several months, the idea evolved rapidly, with 59 biosphere reserves being officially designated in 1976. Two of these original biosphere reserves were in the Southern Appalachian region of the United States: Great Smoky Mountains National Park, administered by the National Park Service; and the Coweeta Hydrologic Laboratory, administered by the U.S. Forest Service (5).

The Multiple Functions of Biosphere Reserves

From the early beginnings, briefly summarized above, biosphere reserves were to serve multiple functions covering the three basic needs or concerns, shown in Figure 2.

By and large, the initial list of internationally designated biosphere reserves did not effectively convey the innovative multifunctional approach embodied in the concept. In the early years (1976-1983), the main criteria used for selection appeared to be the "conservation and research ro-

les". Almost all designated biosphere reserves were already protected areas such as national parks or nature reserves¹ and, in most cases, the designation was not adding new functions. Moreover, research work conducted in these areas was generally of an academic nature and was not clearly related to ecosystem and resource management, nor did it address the relationship between environment and development.

An appropriate balance between the three needs shown in Figure 2 was not reached by this designation process².

As early as 1977, the idea of "clustering" was endorsed by the MAB International Coordinating Council. A "cluster" reserve is shown in Figure 3.

In the late 1970s, the idea of "clustering" aimed at accommodating the many situations where all the functions of biosphere reserves cannot be performed in contiguous areas (for example, national parks) and where a regrouping and coordination of activities between several discrete areas is required. In the early 1980s, the United States began to establish multi-

¹ A national park was normally considered to correspond to a core area and a buffer zone, as shown in Figure 1; therefore in this scheme it was natural for them to be designated a biosphere reserve. However, all national parks were not designated as biosphere reserves.

² There were exceptions to this generalized statement but the exceptions were rare.

Hinote: Building Bioregional Institutions utilizing the MAB Framework

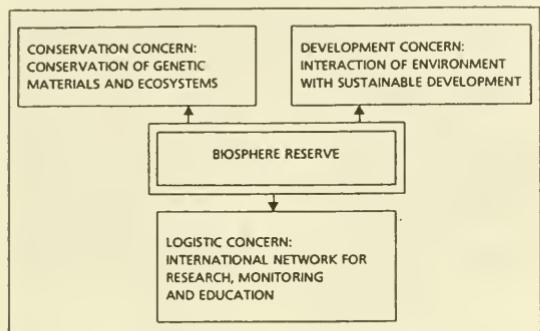


Figure 2: Conceptual combination of the different concerns of biosphere reserves

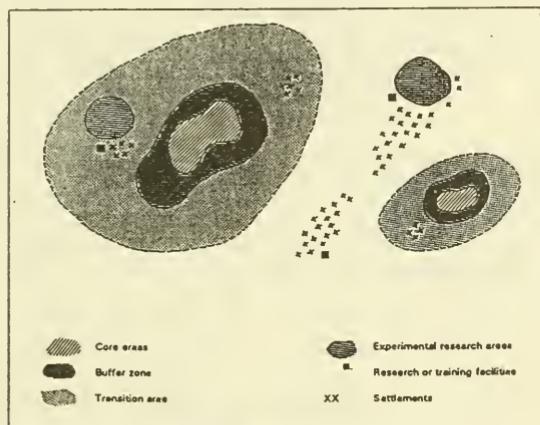


Figure 3: Cluster Biosphere Reserve

ple site biosphere reserves. The intent was to build, through voluntary linkages, large, ecologically delineated conservation units and thereby to encourage cooperation among the administrators of complementary and often contiguous protected areas². The Southern Appalachian Biosphere Reserve, established in 1988, is a multi-unit Biosphere Reserve.

The Southern Appalachian Experience

The Southern Appalachian Region

The region is scenic and the most biologically diverse region in the eastern part of the United States. It is a region of contrasts, with extreme poverty in some areas, but also with a wealth of scientific and management expertise in the agencies and in-

stitutions of the region. Parts of the region have experienced rapid growth of communities, industry, and tourism in recent years. This has resulted in poorly planned land development and degradation of natural resources in some areas. The complex attendant problems of atmospheric pollution, decline in water quality, degradation of natural habitats, and loss of diversity have caused growing concern about the potential of the area to meet the needs of people in the future.

The Southern Appalachian highlands could be characterized as a "bioregion" because of the related flora, fauna, climate, geology, and human cultures; these highlands provide a natural arena for holistic planning and management, for many of the issues are regional in scope and character. The need to better utilize existing experience and to deal with regional and sustainable economic development in the region led to the development of the Southern Appalachian Man and the Biosphere (SAMAB) Program. The basic concept of the program is that natural resource managers must take into account the nature and condition of landscape diversity and natural resources and develop prudent lasting solutions to sustain the resources. Resource management agencies' abilities to sustain resources, maintain diversity, and yield greater benefits to society could be increased through systematic cooperation on a regional scale rather than through separate agency "outreach" programs.

The Southern Appalachian Biosphere Reserve

As mentioned previously, two of the original 59 biosphere reserves designated in 1976 are in Southern Appalachia. Over the next decade (1976-1986), a number of MAB-related activities occurred in Southern Appalachia; for example:

- In 1976 the first bioregional MAB workshop was held at Great Smoky Mountains National Park (GSMP).
- In 1977 the first pilot study sites to develop the criteria and methodology for pollutant monitoring in biosphere reserves were selected in the Great Smoky Mountains.
- In 1978 the Southern Appalachian

² The California Coast Biosphere Reserve was established in 1983 with 8 sites.

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Research and Resource Management Cooperative was formed - a cooperative of six major state universities and three federal agencies. This cooperative was based on MAB principles.

- In 1978 an international workshop (sponsored by U.S. MAB, UNESCO and UNEP) was held in the Southern Appalachians to develop recommendations for long-term ecological monitoring in biosphere reserves around the world.
- In 1980 GSMNP was selected as a prototype for a U.S. MAB report series on the history of scientific activities in biosphere reserves (6).

- In 1984 a conference on the Management of Biosphere Reserves was convened as a major event in the 50th Anniversary celebration of establishment of GSMNP as a national park (7).

In 1985 a U.S. MAB Biosphere Reserve Selection Panel on Biosphere Reserves in the Eastern Forests recommended expansion of the biosphere reserve network. Also in 1985, the U.S. Strategy on the Conservation of Biological Diversity, an Interagency Task Force Report to Congress, recommended that support might be directed toward "... the potential role of Biosphere Reserves as centers for developing the information and skills needed for sustainable conservation of regional ecosystems and for the continuing assessment and improvement of resource management through research".

In 1986 the U.S. MAB National Committee endorsed the nomination of the Southern Appalachian Biosphere Reserve and initiated planning of a model Biosphere Reserve Regional project. UNESCO recognized the Southern Appalachians as one of two areas in the United States which best exemplified biosphere reserve concepts. Also in 1986, the National Park Service's then Southeast Regional Director, Robert Baker, proposed pilot projects in cooperative system planning, and he agreed that the MAB approach should be used in the Southern Appalachians. He described the critical problems facing this region as "... increasing urbanization, pollution, competition for consumptive resources, and the shrinking of personnel and fiscal resources". He stressed the need to begin a process of identifying regional issues and developing objectives and strategies to address them on a scale reaching beyond park boundaries, indicating that "... these efforts should draw their strength from in-

teragency cooperation aimed at achieving common goals - an ecosystem approach which should be discussed with leaders in the area".

In 1988 Southern Appalachia was officially designated a multi-unit biosphere reserve. Three management units were designated: (1) Great Smoky Mountains National Park, administered by the National Park Service; (2) the Coweeta Hydrologic Laboratory, administered by the USDA Forest Service; and (3) the Oak Ridge National Environmental Research Park, administered by a private contractor for the U.S. Department of Energy. Since 1988 two

additional management units have been added: Mount Mitchell State Park, administered by the State of North Carolina; and Grandfather Mountain, North Carolina, administered by the Grandfather Mountain Corporation with guidance from The Nature Conservancy. Figure 4 shows the Zone of Cooperation and the location of the current management units of the Southern Appalachian Biosphere Reserve. Figure 5 is a schematic of the functions of the Southern Appalachian Biosphere Reserve. Note in Figure 5 that the terminology adopted for the Southern Appalachian Biosphere Reserve is somewhat different from that

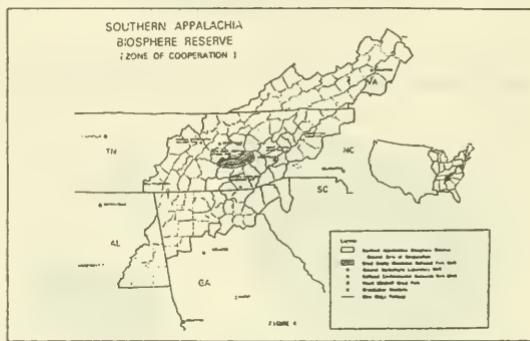


Figure 4: Southern Appalachian Biosphere Reserve

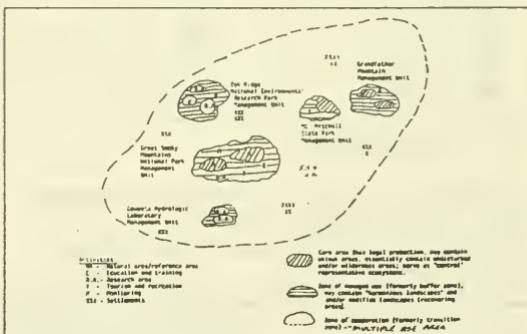


Figure 5: Schematic of the functions of the Southern Appalachian Biosphere Reserve

shown in Figure 3 but the zonation concepts remain the same.

The Formation of the SAMAB Program

As stated above, in 1986 U.S. MAB endorsed the nomination of the Southern Appalachian Biosphere Reserve and initiated planning of a model biosphere reserve regional project. This planning was in the form of a feasibility study based on the concept of a biogeocultural region. In August 1987, site managers and administrators from federal and state agencies met at Clemson University to explore the development of a cooperative organization based on the MAB framework and the aforementioned biogeocultural regional feasibility study. Those present agreed that in order for any activity or organization to be successful it would:

- recognize the need to accommodate compatible economic development with the appropriate enhancement, conservation and protection of natural and cultural resources;
- have the capability to provide economic, natural and cultural resource data relevant to specific regional issues;
- be recognized by interested parties as an organization of reason, influence, and credibility and
- be a source of information for decision makers and opinion leaders interested in and responsible for decisions which could affect natural and cultural resources.

These stipulations, utilizing the MAB framework, ultimately became the operational guidelines for SAMAB.

In August 1988, seven federal agencies and bureaus signed an "Interagency and Cooperative Agreement for the Establishment and Operation of the Southern Appalachian Man and the Biosphere Cooperative". Those signing the agreement were the Southeast Region, National Park Service; Southeast Region, U.S. Fish and Wildlife Service; Southern Region, USDA Forest Service; Southeastern Forest Experiment Station, USDA Forest Service; Atlanta Regional Office, Economic Development Administration; Tennessee Valley Authority; and the Ecological Research Division, U.S. Department of Energy. More recently, Region IV, U.S. Environmental Protection Agency; and the Southeast Region, U.S. Geological Survey became members of the SAMAB cooperative. Other federal agencies - the U.S. Army Corps of Engineers, Soil Conser-

vation Service, and Appalachian Regional Commission - are considering membership. In addition, the six states (shown in figure 4) have been invited to become full and active partners; the State of Georgia has already signed the agreement, and the other states are in various stages of consideration.

With this extensive level of membership and diversity of interests, SAMAB easily has and will expand on the expertise to thoroughly comply with its stated mission for the Southern Appalachian Biosphere Reserve, which is:

... to foster harmonious relationships between humans and their environment through programs and projects that integrate the social, physical and biological sciences to address actual problems.

To accomplish this mission, SAMAB is promoting environmentally sound, sustainable resource management and economic development through research, management, and educational activities. These involve participation by all levels of government and private interest groups in the Southern Appalachians.

The SAMAB Program

The SAMAB Program is made up of two organizational entities: the SAMAB Cooperative, consisting of federal and state agencies who sign the Interagency and Cooperative Agreement and their participating organizational representatives and the SAMAB Foundation, a nonprofit organization made up of university, corporation, local governments and private organizational representatives. Figure 6 displays the organizational structure of SAMAB.

The SAMAB program established a secretariat in June 1989 to coordinate the work of both the SAMAB Cooperative and the SAMAB Foundation. These SAMAB organizations are responsible for developing their own program of work and priorities consistent with the objectives of the participating agencies and institutions and the mission of MAB. Special emphasis is placed on major issues in the Southern Appalachian Biosphere Reserve. Initial funding for the program is supplied by the participating federal agencies in the form of direct contributions, grants, and in-kind services. A significant portion of the long-term funding support is expected to be through the nonprofit SAMAB Foundation, which will enable the private sector and other institutions to be more directly

involved.

Although the program is less than 3 years old, commitment and support for the program is growing, both from the members of the Cooperative and the Foundation. SAMAB has made significant progress and has some successes it can be proud of, including:

- Being accepted as a prototype model for the rest of the country - the first regional program to be adopted formally by the U.S. MAB Program. This gives SAMAB recognition and status, but what it means in practical terms is that SAMAB has ready access to the network of biosphere reserves around the world which can help it tackle Southern Appalachian problems such as biodiversity, global change, and sustainability. It also gives SAMAB a broader sphere of influence internationally and nationally.

For example, working with the U.S. MAB Temperate Ecosystem Directorate, a research proposal was funded by U.S. MAB. With this project, land-use patterns in Southern Appalachia and in the Olympic Peninsula of Washington State are being examined to determine what implications the patterns of land use might have for long-term sustainable development and environmental vitality.

- Publishing brochures and other materials and working closely with the major media of the region in an effort to inform the public of the role and functions of biosphere reserves as well as to enlist its acceptance and support. Through these efforts, the public is becoming much more involved.

■ Developing a model community program to demonstrate that tourism development and natural resource protection can be compatible. Pittman Center, Tennessee, was used as the model community. The model program was completed and 500 copies were printed of the publication, "Sustainable Development Strategies for Communities with Tourism-Based Economies in the Southern Appalachian Highlands". This model is expected to become a model for other communities and to form the basis for developing a regional tourism strategy.

- Organizing a workshop on the use of native plants for botanical and pharmaceutical purposes. Research on the use of native plants for commercial purposes has revealed two basic concepts. One recommends increased harvesting of the plants for economic purposes; the other calls for enhanced protection of the species involved.

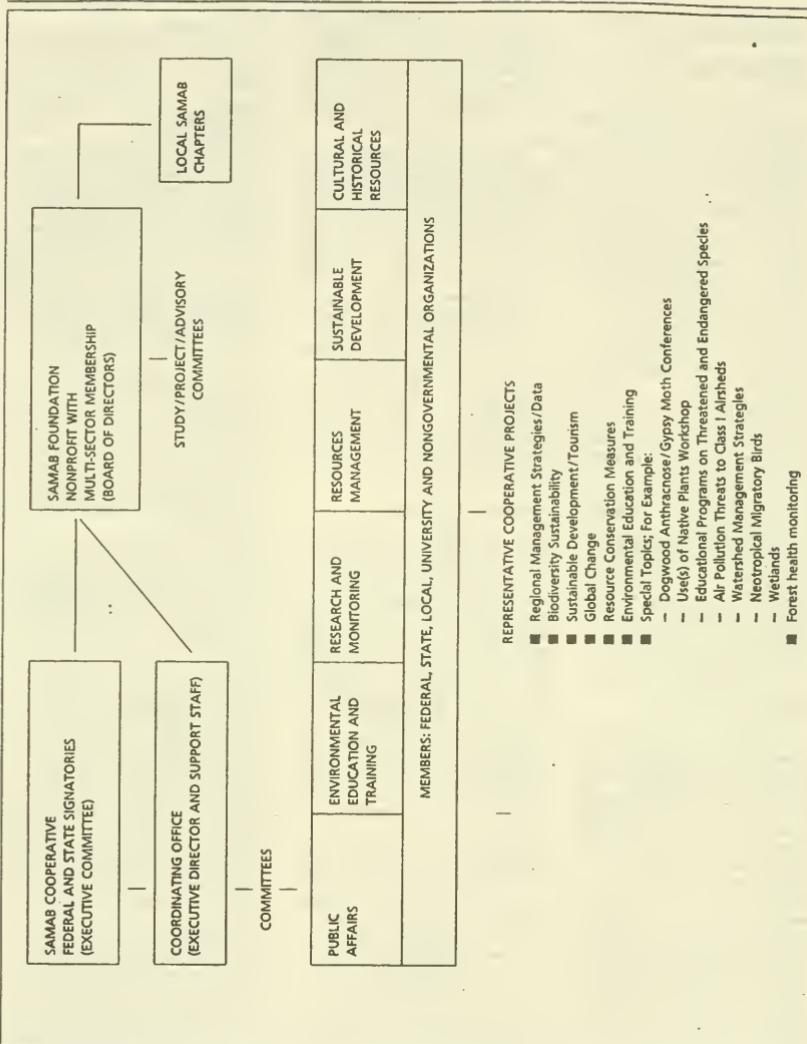


Figure 6: SAMAB ORGANIZATION STRUCTURE

ved. The conflict is obvious, but there is not a database adequate to address the opposing views.

■ Organizing annual planning conferences, with recognized speakers, to define issues, establish priorities and develop cooperative projects.

■ Cooperating with the Tennessee Valley Authority to produce the "Annual SAMAB Conference" (at Gatlinburg, Tennessee). A range of environmental issues and problems throughout Southern Appalachia are addressed. In November 1992, the principal focus will be on biodiversity issues.

■ Providing support for the establishment of a national "Center for Oak Studies", which is initially located at the University of Tennessee-Knoxville.

■ Compiling a directory of "Environmental Education and Training Activities" within the SAMAB organizations which was published in 1991.

■ Holding three successful workshops (Knoxville, TN; Roanoke, VA; and Asheville, NC) to help inform the public about the threat of dogwood anthracnose (a fungal disease affecting the flowering dogwood). Other conferences are planned dealing with exotic plants and insects affecting the Southern Appalachian Biosphere Reserve.

■ Assisting the Southeast Forest Experiment Station in providing an educational video for the Bent Creek Experimental Forest.

■ A 30-minute television program, sponsored by SAMAB, on the reintroduction of the endangered red wolf into the wilds of Great Smoky Mountains National Park was produced and shown in prime time by the Knoxville NBC affiliate in December 1991, and in Asheville, NC in May 1992. An educational poster entitled "Back from the Brink" was developed, and 8000 copies printed along with a teacher's guide developed and distributed to all schools in the SAMAB Zone of Cooperation. This program has attracted national and international attention (the poster was recently selected as one of the top 20 posters in the United States).

■ Holding a 3-day conference on "Air Quality Research, Monitoring and Management in Class I Airsheds of Southern Appalachia". Several follow-up activities have been initiated.

The SAMAB program has both permanent and ad hoc committees (Figure 6) to identify issues and implement its work program. Some highlights of activities that the committees continue to work on are:

■ The model community program mentioned above demonstrated that tourism development and natural resource protection can be compatible; but strategic planning, resources inventory and a concept plan are required for it to happen. The development of an "outreach" program into other communities surrounding protected areas, such as national parks and monuments and wilderness areas, is underway.

■ Several follow-up activities are progressing on the dogwood anthracnose issue. Among these are the printing and distribution of 500000 copies of a pamphlet, "How to grow and Maintain Healthy Dogwoods...", a cooperative effort of the SAMAB program, the Izaak Walton League, Champion International Corporation, and the Southern Nurserymen's Association. The development of an education program (video, poster, teacher's guide) is in progress.

■ In cooperation with the Southeast Region of the National Park Service, a Cultural Resources Workshop was held in April 1991. The regional biosphere reserve was proposed as the integrating mechanism for preserving and promoting these resources in the Southern Appalachians. A cooperative program is currently being developed.

■ A forest health monitoring program for the Southern Appalachia Biosphere Reserve has been initiated. This program has been developed following the procedures of the "Environmental Monitoring and Assessment Program" (EMAP), initiated by EPA and the USDA Forest Service.

■ A cooperative air quality monitoring and modeling program is underway.

■ Several workshops/conferences are at various stages of development. These deal with subjects such as wetlands, best management practices, exotic plants, insects and diseases, migratory birds and their habitats and biological diversity.

■ Other environmental education programs (TV programs and videos, posters and teacher guides) are in various stages of development.

Summary

The MAB Program is now about 20 years old. If it is considered to be an outgrowth of the International Biological Decade of the 1960s, it can be argued that it is more than 25 years old. Regardless of the starting point, it can reasonably be assumed that from the beginning it has been concerned with the rational use and conserva-

tion of the resources of the biosphere⁴, and that the best known of the MAB programs is the establishment and recognition of biosphere reserves. As of May 1990, 285 reserves in 72 countries, covering more than 150 million hectares, had been designated by UNESCO.

The concept, recognition and implementation of biosphere reserves has had a somewhat hazy and ill-defined history. However, from this beginning the concept has evolved and blossomed over the past decade⁵. Biosphere reserves are designed to conserve, gather, analyze, communicate and employ information for the purpose of sustaining natural and managed ecosystems. While no model of a biosphere reserve applies universally in practice, any biosphere reserve - no matter where it is located in the world nor its particular zonation as long as it contains a legally protected core area - must to some extent address itself to the multifunctional roles of conservation, development and a network for research, monitoring and education (Figure 2). The relative combined effect sets biosphere reserves apart from other protected areas, makes them unique and offers the greatest opportunity for maintaining landscape diversity.

The Southern Appalachian Biosphere Reserve, established in 1988, is a multiunit, multifunctional biosphere reserve. Steps have been taken by the administrative authorities in Southern Appalachia to implement a fully functional biosphere reserve. The first step related to the recognition of Southern Appalachia as an ecological, biogeocultural and/or ethnological region has been taken. The second step consisted of putting a coordinating group in place (Figure 6). While not yet at the final stage,

⁴ Maintaining landscape diversity is certainly encompassed in this broad concept.

⁵ For example, in *Environmental Quality, the Twenty-First (1990) Annual Report of the Council on Environmental Quality*, together with the President's Message to Congress, Chapter 4, entitled "Linking Ecosystems and Biodiversity", recognizes the significant roles that biosphere reserves can play when accompanied by "a mechanism that would allow cooperative management of the regional ecosystem". The SAMAB Cooperative is recognized as having the potential to provide this cooperative mechanism for the Southern Appalachian ecosystem.

Hinote: Building Bioregional Institutions utilizing the MAB Framework

a fully operational and coordinated management plan for the entire zone of cooperation, progress is being made to enlist the continuing support and cooperation of the local people (through a series of programs, projects and activities) without which long-term sustainable conservation of species or ecosystems is seriously open to question. Bioregional institutions focused around an "ideal" biosphere reserve offer a sound basis for maintaining landscape diversity and sustaining the natural and human resources of an ecosystem.

References

- (1) For a more detailed explanation, see "Developing and Focusing the Biosphere Reserve Concept" by Michel Batiste, a reprint from Vol. XXXII (3), July-September 1986, UNESCO Nature and Resources. Much of this discussion is taken from that report.
- (2) MAB's immediate predecessor was the International Biological Program (IBP), which was launched in the 1960s through the joint efforts of UNESCO, nongovern-
- mental scientific organizations and participating governments in the developed countries. IBP's interdisciplinary projects amassed huge banks of basic information on deciduous forests, grasslands, tropical forests and other natural regions of the world. In view of the decade's end and potential termination of the program, many scientists saw the need to maintain the program's momentum while expanding and redirecting its efforts.
- (3) Projects (themes) 1-7 focused on major natural regions or biomes (for example tropical forests, temperate forests and lands, islands and so on). Projects (themes) 9-14 were concerned with types of interactions between man and the environment (for example cultivation systems, urban ecosystems, perception of environmental quality and so on) with the objective of improving these relationships through scientific understanding.
- (4) "Task Force on Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves", UNESCO, 1974, 61 PP (MAB Report Series 2).
- (5) For a more detailed history, see "Biosphere Reserves, Their History and Their Promise" by William P. Gregg, Jr., and Betsy Ann McGean, in *Orion Nature Quarterly*, Vol. 4 (3), Summer 1985, pp 41-51.
- (6) Great Smoky Mountains Biosphere Reserve: History of Scientific Study, USMAB Report 5, March 1982. USDI National Park Service, Southeast Regional Office, Atlanta, GA. 276 pp.
- (7) Proceedings on the Management of Biosphere Reserves. Great Smoky Mountains National Park Biosphere Reserve, Gatlinburg, TN, Nov. 27-29, 1984. USDI National Park Service, Southeast Regional Office, Atlanta, GA.

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GREGORY APLET

Mr. Chairman, and Members of the committee, I am Gregory H. Aplet, Forest Ecologist for The Wilderness Society. I am pleased to be invited to express my views on this important and timely issue.

The Wilderness Society's Bolle Center for Forest Ecosystem Management was established in 1991 to promote sustainable management of the forest lands of the United States. At The Wilderness Society, we are interested in ecosystem management as a process to achieve sustainability, where sustainability implies maintaining biological diversity and the productive capacity of ecosystems.

As principles and definitions develop, ecosystem management is turning out to be as complex as the ecosystems to which it is to be applied. Practicing ecosystem management will require resolving important social issues regarding public involvement and public choice as well as complex technical issues. Central to many discussions of ecosystem management is the need to cooperate across multiple ownerships and to tailor management decisions to local ecological conditions.

At The Wilderness Society, we recognize the importance of cooperation and local decision making to sound environmental management, but we emphasize that environmental and procedural laws, well as natural laws, must not be broken in the search for local consensus. We believe that socially optimal decisions will result at the local level only if they are made in the context provided by the laws of the State and the Nation.

One of the greatest obstacles to the implementation of ecosystem management is the absence of an effective framework to allow the concerns of the larger society to be represented where the tough decisions need to be made—at the local level. This is not unique to ecosystem management, it is the central challenge of a Federal democracy. Making it work will take more than local cooperation.

Today's hearing highlights several efforts to take more of an ecosystem approach to management through local planning. While it is still early to judge the ultimate success of many of these efforts, where projects appear to have been most successful, they have possessed two important characteristics: 1) they have operated clearly within the law, and 2) they have been based solidly on ecosystem science. Each approach embraces certain ecosystem principles and seeks to develop strategies consistent with those principles. The most successful early efforts at ecosystem management recognize the following five properties of ecosystems:

1) Ecosystems are physically defined pieces of the earth that occur at all spatial scales from very small, for instance a log on the forest floor, to very large, up to and including the entire planet. Ecosystems are arranged in a hierarchy such that large ecosystems are composed of smaller ecosystems.

2) Ecosystems can be characterized in terms of patterns and processes. Pattern includes both the kind and quantity of ecosystem elements and their physical arrangement. Process refers to the interrelationships and dynamics that bind ecosystems together.

3) Ecosystems continually change in response to key processes. In terrestrial ecosystems, an important process affecting ecosystem character is disturbance, including fire, insect outbreaks, and extreme climate.

4) People, like all organisms, are affected by the quality of their ecosystems. People also affect their ecosystems and are important, integral members of ecosystems at larger scales. The effects of people on ecosystems range in intensity from minimal effects on chemistry to total displacement.

5) Ecosystems can be extraordinarily complex traditional approaches to management have assumed ecosystems to be much simpler than they are now understood to be. Sustaining complex ecosystems will require far greater humility toward the environment than has been demonstrated in the past.

These five properties of ecosystems suggest a set of five elements that should be a part of any program of ecosystem management:

ELEMENTS OF ECOSYSTEM MANAGEMENT

1. A hierarchical classification system that recognizes regional ecosystems.
2. An analysis of rare elements of biodiversity and the processes that sustain diversity and productivity.
3. A short-term strategy to protect critically imperiled elements of biodiversity and a long-term strategy to maintain or restore key ecosystem processes.

4. A land system that includes the entire spectrum of human influence from wilderness to dominantly human use, with allocations made based on conservation needs.

5. A rigorous process of adaptive management aimed at improving our understanding of ecosystems over time.

A strategy that employs these elements to protect biological diversity and maintain productive capacity will be a sound plan ecologically. Involving the human dimension represents a greater challenge. As the Scientific Panel on Late-Successional Forest Ecosystems noted, science can only take the process so far, the real decisions are made by the people. What has distinguished the more highly regarded efforts at cooperative ecosystem management is not a reliance on science for "the answer," but an insistence that decisions be by science. Science has shaped the "vision" or "desired condition" that is the objective of management. Two examples with which I am familiar are the Chequamegon National Forest in Wisconsin, where managers are attempting to conserve biological diversity using a strategy developed in close cooperation with the North Central Forest Experiment Station, and the Applegate Partnership in southern Oregon, where residents are developing a common vision based on information learned from an independent scientific advisory board.

This notion of a common vision is emerging as key to cooperative decision making. Historically, vision has come at the national level in the form of laws protecting endangered species, clear air, and clean water, and at the local level in the form of forest plans to produce goods and services. For a number of reasons, these approaches and the clashes between them have failed to provide a clear vision of the kind of ecosystems we want as a society. If we can get past the battle over what we want *from* our forests and arrive at a common vision of what we want *for* our forests, it is possible that much of the current contentiousness will subside.

The Forest Service is attempting to arrive at this vision for the lands it manages through the concept of desired condition. Currently being explored in the Eastside Ecosystem Management Project and in Region 5's Draft Ecosystem Management Guidebook, desired condition is meant to reflect human choices *informed* by an understanding of the ecological capability of land and water ecosystems. Sustaining diverse, healthy ecosystems is the overarching objective, but subordinate objectives and means to achieve them are decided through the political process.

It remains to be seen how effective the Forest Service will be at integrating the preferences of various communities of interest, local communities, and the Nation at large through the Desired Condition Concept, but it appears to be a step in the right direction. The Wilderness Society is committed to participating in the further development of ecosystem management at the Forest Service and elsewhere, as the concept represents an encouraging step toward a diverse, healthy, sustainable future.

KEVIN BOLING

I am Kevin Boling, Resource Manager for Potlatch's Idaho forest lands. In northern Idaho, Potlatch operates sawmills, plywood plants, and a large pulp, paperboard and tissue complex. Many people in our rural region are dependent on us, including more than 3,000 employees. This is not a lot of people by urban standards but is significant in our area. We own roughly 670,000 acres of forest land, which provides about 65 percent of the fiber we need for our sawmill and plywood operations, and about 25 percent of the raw material for our pulp-based operations. The remainder of our raw material originates on other ownerships, including lands owned by other private interests, as well as by the State and Federal Governments.

We are interested in cooperative landscape management activities for two simple reasons. First, we recognize that even on our private lands we must earn and keep the public's trust in order to continue operating in northern Idaho. We believe the way we earn and keep the public trust is to manage and care for the many resources on our lands, which include wildlife, waterways, timber and aesthetics. Second, other land owners, both public and private, who provide us with fiber, must also earn and keep the public trust.

Our lands are intermingled with other ownerships, and since natural resources do not normally recognize property lines it is often helpful to cooperatively manage across ownership boundaries. This provides the diversity and balance of forest conditions necessary to enhance and protect healthy ecosystems fully, but does so without compromising the rights of private property owners.

Last summer Potlatch proposed to the Palouse Ranger District of the Clearwater National Forest that we try a cooperative pilot planning effort. At that time, we did

not have a planning process to integrate resources across two land ownerships. A major objective of the pilot project was to develop a process. We wanted to define common management goals while respecting differences in specific management objectives. We selected a small watershed as a pilot area to create and test a planning process. The results of the project are described in the document we have submitted to the committee.

Permit me to highlight some key points about the process:

- Cooperative planning requires a common base of information. By information, I mean data with a purpose. Our process builds a site-specific database, with sufficient resolution to allow for a field-level land manager to implement a resource management plan.
- The process identifies key forest structures on the landscape and their function. This aspect of the process facilitates cooperative planning in an ecological framework. It also respects the confidentiality of sensitive commodity-based forest inventories. Agencies do not want private industry to have access to their detailed timber inventories, and we do not want to give our inventory information to others.
- We initiated a current condition assessment. This assessment was an integrated analysis of stream health and water quality, wildlife habitat, silvicultural potential and recreation facilities as well as a transportation plan. Objectives were developed for each resource by the appropriate specialists but were reviewed by all members of the planning team to identify complementary or conflicting objectives.
- Resource management objectives were defined for the landscape from the current conditions assessment. This point is central to the concept of adaptive management. Guidelines are developed recognizing the conditions of the site, rather than applying uniform standards across every landscape.
- The assessment of current conditions is the starting point for preparing landscape objectives, not an end itself. The planning process continues with the design of future landscapes. Silviculture, harvesting, and road management are primary tools to achieve desired forest stand structures. Timing and total area affected by these tools are major considerations.
- Technology now allows us to evaluate the effects of planned activities on future landscape conditions. Alternatives can be generated and tested efficiently prior to plan adoption. Results are affected in part by the timing and magnitude of disturbance introduced in the landscape.
- The combined evaluation of activities across ownerships demonstrates that differing management objectives can complement, rather than hinder, good stewardship.
- Although the project was a prototype and not a final plan, there were tangible benefits. The cooperative road plan reduced total road miles required. In addition to the financial benefit, this reduced potential sources of stream sedimentation. A cooperative road maintenance plan is under development to reduce erosion from existing problem sites within the watershed. In addition, sensitive riparian areas that cross ownership boundaries were identified; these areas will be treated with minimal disturbance.
- Additional benefits will be realized as we proceed beyond the prototype stage. Potlatch will develop landscape plans across its 2.2-million-acre northern Idaho operating area over the next 5 years. Cooperative planning efforts will be pursued whenever feasible.
- In the immediate future we plan to develop a similar cooperative plan with the Idaho Department of Lands. This November, another area will be jointly selected with the Palouse Ranger District and the process initiated for a 30-40,000-acre landscape. Other land owners will be encouraged to participate. In addition, there are at least two other potential cooperative efforts under discussion with other districts on two national forests.
- The public's interest in natural resources is changing the standards for forest management. We respect that interest, and are firmly committed to an adaptive landscape management approach as a way of achieving high standards of land stewardship while simultaneously providing wood products for American families. Cooperative landscape planning can contribute significantly to this goal. We are convinced the results will be superior to

those achieved from efforts which concentrate on any single resource, or on any single ownership.

JOHN SHEEHAN

Thank you to the Chair for asking our organization to testify.

At the Northwest Forest Conference last Spring, the environmentalist Andy Kerr said: "When you say ecosystem management, I hear 'ecosystem', while a forester hears 'management'." The carrying out of this new approach to the forests and rangelands will take a continuing definition and redefinition of terms that will gain and lose currency while this sea change takes place. The key, I believe, is to constantly keep the focus on the ground in question: on the stream reach, forest stand, pasture or community that is the subject of our attention.

I work for the local non-profit economic development corporation in a mountainous, forested county of 20,000 people. Plumas County has three quarters of its almost 2 million acres managed by the U.S. Forest Service for the people of the United States. Plumas Corporation was set up in 1983, in response to a 22-percent-annual unemployment rate and a local perception that our timber dependent economy needed diversification. Attached to my testimony is a review of the current economic dependency of our area on the national forests.⁷

Plumas Corporation carries out tourism promotion as well as business attraction, retention and expansion programs for the County. More to the point, since 1985 we have also been carrying out a wide range of stream restoration, research and management modifications throughout our watershed.

We operate within an enabling framework called Coordinated Resource Management (CRM) that was developed by a Federal interagency (resource agencies) agreement in 1980 and mimicked by our State in 1983. The key to CRM is its ability to share staff and resources among the partners while focusing jointly on particular landscape segments or management issues. We broadened the CRM concept locally when we adopted our formal Memorandum of Agreement in 1987 (attached)⁸ by including local governmental entities, Plumas Corporation as well as our regional utility: Pacific Gas and Electric Company. From the effort's initiation, Plumas Corporation was given the role of coordination and implementation. This was due to the other participant's perception that we had the least disingenuous of motivations: the creation/retention of local jobs.

Projects accomplished include complete problem analyses, prioritizing and costing of needed improvements by subwatershed. They include restoration activities ranging from road modifications, revegetation, check dams, fish ladders, fencing and stock-water developments to full geomorphic reconstruction/revegetation projects and rewatering of meadows. This summer's big project (after 5 years of planning) is starting reclamation of our only superfund site: an abandoned mine spoils area. As a direct result of our CRM projects, we now have trout passing through stream systems where there have been barriers for 50 years. We've significantly reduced erosion in treated areas. We have 6-hundred-percent increases in waterfowl on monitored projects. We have created wetlands and purer late-season streamflows. All of our projects have used locally available rocks and plants as the prime building materials. All of our construction contracts have gone to local firms, primarily for heavy equipment operation and material transport.

Three businesses have started due to our mutual efforts: a wholesale nursery specializing in climatized native plants to supply regional restoration efforts, a stream monitoring and environmental analyses firm and most happily a watershed restoration program, with an associate degree, at the local junior college.

CRM focuses on cumulative watershed effects remediation, on public and private multiple use lands. Our project designs seek to mimic natural functions. In all cases, the land owners lead the process since all the projects have been voluntarily undertaken. The Feather River Resource Conservation District serves a critical role as the liaison between the public regulators and the private land owner. The District's long term horizon provides the perspective to properly prioritize our efforts. The RCD and SCS's future should continue to be tied to the resource base as opposed to commodity export.

The development, feeding and success of the CRM has come about through the locally driven, ongoing, voluntary, consensual partnership of the seventeen signatories to the MOA, each responding to "enlightened self interest." It has weathered three national administrations and two State governors. The specific arrangements

⁷Retained in Committee files.

⁸Retained in Committee files.

vary from project to project, although there are usually a dozen (public and private) financial contributors to each major project. The organizational structure is decidedly non-hierarchical. It was not invented within this beltway or by regulation. The current Forest Supervisor initially described it as "that bubble group that gets things done but I don't know how." We have organized ourselves to provide constant feedback loops to modify our practices and projects. We have both a functioning pipeline of planning and design and we deliver on the ground projects. I offer this chart not as the *be-all, end-all* of such charts but as a contrast to the non-inclusionary, rote methods by which people have been forced, by law and regulation, to carry out tasks and make decisions within the U.S. Forest Service.

Now we have begun a broader effort that looks at a forest management and restoration program for public lands in the Feather River watershed: *The Quincy Library Group (QLG)-Community Stability Proposal* (attached)⁹. Many of you were visited in February by members of the QLG. This locally initiated ecosystem management effort extends the watershed restoration work that the CRM has accomplished and proposes a strong monitoring function (as with the CRM). The QLG proposal builds on the harvesting practices of one successful local mill-Collins Pine Company, the first major mill in the country to receive the "Green Cross Certification" for its environmentally sound practices on its own local forest. QLG also posts a major fuels reduction program to decrease the incidence and severity of "stand destroying fires" that will ruin the trees, habitat and critters. We hope that this program will also provide enough timber to run the existing local mills, if USFS can gear up to carry it out. We believe that this and other partnerships will not succeed unless the USFS finds new ways to afford meaningful, positive and ongoing public involvement.

The Quincy Library Group, we believe, is the first partnership group in the country to come to you with a locally initiated, consensus-driven ecosystem management program emboldened by the on-the-ground experience to back up our words.

QLG has reached consensus because it has found a set of principals that are agreed upon, as opposed to focusing on divisive issues. QLG proposes some major changes to the Land Management Plans on the three national forests in the QLG area.

No timber targets are to be set. Outputs are to be expressed in acres treated per year to achieve forest health. QLG uses the CRM "mimic natural functions" principles. We propose to reintroduce the role of fire into the ecosystem, over time, in coordination with an aggressive "thinning from below" timber program. This will, we believe, prevent the stand destroying, crown fires that are increasing threats to all the Forest products and creatures in the drier portions of the West. We propose uneven age management and a longer harvest cycle. Sensitive, roadless and wilderness areas are, in effect, left off the map, in that they won't be subject to interventions during the 5 years of the QLG. Fireproofing around those areas will be addressed.

The experience local groups have gained through the authorities contained in the 1990 Farm Bill, particularly in Subtitle G with its emphasis on locally generated efforts, lead us to hope that you will greatly expand those authorities in the upcoming Farm Bill reauthorization. State, Private and Cooperative Forestry USFS can assume a at larger role in facilitating ecosystem and restoration partnerships on USFS lands. New USFS flexibility in "end product" contracts, restoration "credits," KV funding deregulation, local cooperative agreements, subcontracted third party monitoring and service agreements must be put in place to allow for local and environmental buy-in to a downsized, USFS ecosystem management.

All the Federal agencies (EPA, SCS, USFS, etc.) we deal with will continue to shrink. Reinvention of this Government must include ways, such as those addressed above, to carry out the necessary environmental and economic functions that our forests and rangeland are supposed to perform but have not and will not be able to perform under the current budgets, authorities and ways of doing business. Subtitle G authorities and appropriations should be expanded to allow "Reinventing Government" pilots for Ecosystem Management to be designated in areas, like ours, with active, ongoing and successful partnership programs.

Absent action on your part, local loggers, ranchers, mills and communities will continue to take all the blame for past environmental problems. Without new implementation options, the "least cost" solution to environmental problems will be simply to eliminate the humans. The gridlock will not disappear until groups like ourselves are permitted to show you all that there are more pleasing and cost-effective alternatives to acrimony, penury and the courthouse.

⁹ Retained in Committee files.

We have asked for Congressional funding to carry out the QLG project. However, we also realize that there isn't enough money to take care of all our prospective work. We should be permitted and encouraged to pursue long term, market-oriented reinvestment strategies. These would include green-cross-type certification for whole watersheds and all their outputs, FERC relicensing preference for hydroelectric producers and projects that improve their watersheds on a basin scale (like PG&E with the Feather River) and also Forest Health and Watershed improvement contributions by downstream water users.

Thank you for your interest and I'll respond to any questions.

**SENATOR COCHRAN'S QUESTIONS SUBMITTED TO JACK WARD THOMAS
AND RESPONSES THERETO**

Jack Ward Thomas

Question 1. How does the Forest Service plan to ensure that a "one-size-fits-all" mentality is not used when applying this concept to diverse regions of the country?

Response. There is no simple or easy way to address the long-term sustainability of diverse ecosystems or the long-term needs of the societies within these systems. We believe, for example the response of the southern forest ecosystems to management activities will be significantly different than the Pacific Northwest forest ecosystems.

However, a single ecosystem management strategy is shared not only within the Forest Service, but among many other Federal land management agencies. It is a strategy that allows for variability of specific ecological, economical and social factors for each ecosystem. It allows for the protection of ecosystem functions and processes that frame the productivity and resiliency of the inherent elements. It is an adaptive and flexible process that calls for the best applicable science for that particular set of natural and human factors. It is a process that encourages grass roots participation and the development of partnerships with shared expectations and shared responsibilities. It is this over-arching concept that we support.

Question 2. The BLM will also be implementing ecosystem management on its lands throughout the United States. What agency has the lead role to ensure consistency between agencies?

Response. Due to the complexities of implementing ecosystem management, no one group or agency alone has the resources to completely address all the significant aspects of taking an ecological approach to management because of these complexities, leadership on a particular ecosystem management activity will require mutual sharing of information and skills across agency boundaries.

Currently, we have entered into memorandums of understanding with numerous Federal land-holding agencies and are collaborating with other land owners such as State, county and municipal governments, Native American tribal governments, and private land owners on social and ecological issues that cross political boundaries. The Columbia River Basin assessment in the Pacific Northwest and the Southern Appalachian Man and the Biosphere Program (SAMAB) in the Southeast are examples of this approach.

The recovery plans for the red-cockaded woodpecker may include the relocation of see birds fro outside Mississippi to the Bienville National Forest in Mississippi. This seems to be single purpose management of this forest.

Question 3. Does this fit into the ecosystem management philosophy?

Response. It is true that the Forest Service may relocate individuals to augment small populations in jeopardy of extirpation, but this does not constitute single species management. For example, managing the southern pine lands for the red-cockaded woodpecker provides habitat for numerous plant and animal species that are becoming quite rare. This type of endangered species management is a critical component of ecosystem management, and is a proactive strategy that may preclude the need to list many of these declining species.

Question 4. How does the management of endangered species fit into ecosystem management?

Response. The red-cockaded woodpecker is very compatible with multiple-use management, including timber harvesting. In fact, to recover this species, intensive forest management is essential. The most reliable and economical way to provide the habitat needed is through commercial timber sales. This, combined with controlled burning which emulates natural fire processes, will provide the habitat needed.

Other important multiple use activities of National forests such as recreation and hunting will remain unaffected.

POSITION STATEMENTS

The Sierra Club Legal Defense Fund (SCLDF)

The Sierra Club Legal Defense Fund (SCLDF) appreciates the opportunity to present testimony at this oversight hearing on ecosystem management. The Legal Defense Fund is a non-profit, public interest law firm, separate from the Sierra Club, that represents citizen groups in litigation to protect our Nation's natural resources and to enforce its environmental laws.

BACKGROUND

The Legal Defense Fund has represented local, regional, and national environmental groups in some of the most important ecosystem protection litigation in the Nation. Included among our recent cases are efforts to protect old-growth ecosystems in the Pacific Northwest, the Greater Yellowstone Ecosystem in the Rockies, the Everglades Ecosystem in Florida, and the San Francisco Bay Ecosystem in California.

There is a common thread between these and the many other ecosystem protection lawsuits that SCLDF has brought: a chronic failure of local, State, and Federal regulatory agencies to adequately monitor ecosystem health and to enforce existing environmental laws. That failure to monitor ecosystems and to implement the laws that would protect them has put many vitally important ecosystems in this country at risk.

The truth is that the ecological crises facing our Nation (and the world) have not been caused by a failure to "manage" ecosystems. They've been caused by routine overmanagement and, in many cases, mismanagement of those ecosystems.

The Legal Defense Fund is committed to an ecosystem-based approach to protecting our great, but declining, natural resource heritage. Even a cursory review of our docket reveals the breadth and depth of that commitment. Thus, we support efforts to implement new policies and practices to ensure that the entire range of ecosystem types are protected and, where degradation has already occurred, restored.

Nonetheless, we are disturbed by evidence that some public land managers and users may be jumping on the "ecosystem management" bandwagon because they see it as an opportunity to extend business-as-usual over management and mismanagement to all ecosystems on public lands—including wilderness areas, wild and scenic rivers, and wildlife refuges. The examples below illustrate our concerns.

EXAMPLES OF "ECOSYSTEM MANAGEMENT"

As described above, we believe that the new-found enthusiasm for ecosystems is laudable. However, we believe the emphasis must be on the ecosystems and not on the management. By contrast, some documents we have seen attempt to define ecosystem principles in a clearly anthropocentric context.

For example, defining ecosystems to include economic and social values, and then basing "management" of the ecosystem on improving the economic and social welfare of surrounding communities, would not only be inconsistent with any generally accepted view of an ecosystems approach, but it would also continue many of the same natural resource management practices that are degrading ecosystems today.

The examples we are providing of projects that Government agencies have designated as "ecosystem management" are illustrative, not exhaustive. Although we have not found any shining examples of "good ecosystem-based management initiatives," we are not suggesting that there aren't any out there. We simply haven't come across them.

One reason for the lack of "good" examples of ecosystem management is that, in virtually all cases, it is too early to tell whether something that is being called "ecosystem management" will actually benefit the ecosystem. By contrast, it is relatively easy to tell if a project being touted as an ecosystem approach is really just old wine in a new bottle.

Having said that, we do believe U.S. Forest Service Regional Forester Dave Jolly (Northern Region) deserves credit for publicly rebutting claims that wilderness protection is inconsistent with the Agency's new ecosystem principles and initiatives. Mr. Jolly reportedly stated that wilderness areas are *not* incompatible with ecosystem management, and that, in fact, they are a part of it because wilderness provides "fundamental laboratories where we can see how ecosystems operate when left alone."

He is right: ecosystem management does not mean the entire ecosystem must be managed.

"BUSINESS-AS-USUAL"

On June 4, 1992, then-Forest Service Chief, Dale Robertson announced a new ecosystem management initiative, through which the Agency would use an "ecological approach" to managing the national forests and grasslands. Shortly after the Chief's announcement, Francis Marion & Sumter National Forest Supervisor, David Wilson sent a memo to all district rangers and staff officers on the forests which stated in part:

Remember, ecosystem management is many things to many different people. Using ecosystem terminology in our discussion of the issues may just be the ticket to successful public relations.

Meanwhile, a "Question and Answer" piece developed by the Southern Regional Office of the USFS and distributed to all forest supervisors and rangers in the Region included the following question: "Under ecosystem management, does the production of timber become a secondary product?"

While the question itself suggests that timber production had been the primary product on those national forests, the answer underscores the "business-as-usual" attitude about ecosystem management that is revealed in the David Wilson memo:

Ecosystem management is the means to an end, not an end in itself. Ecosystem management is the means we use to meet the goals specified in our programs and plans . . . We can produce timber on many acres at the same time we are producing other benefits. And since the trees grow back, the Forest as a whole can always look the same . . .

The message is clear. If ecosystem management is only a means to an end, and that end is the Forest plan goals, and the Forest plan goals made timber production a primary product, then nothing has changed except the label. Ecosystem management will, indeed, be used as "just the ticket to successful public relations."

FLATHEAD NATIONAL FOREST "MIDDLE FORK ECOSYSTEM MANAGEMENT PROJECT"

This is a classic example of the Agency using "ecosystem management" in an attempt to continue logging as usual on a national forest.

According to our information, the Flathead National Forest issued a scoping notice in February, 1992 asking for public input on a proposed timber sale that would log 6.7-million board feet of timber in a narrow roadless corridor adjacent to the Middle Fork Wild and Scenic River between Glacier National Park and the Great Bear Wilderness. Given the wildlife impacts of the proposed sale, and the fact that much of the north-facing slope of Dickey Creek, a hydrologically sensitive watershed, was slated for clearcutting, this was a proposal that was sure to attract controversy.

When the draft EIS came out 18 months later, however, the proposal had apparently been transformed as if by magic from a "run-of-the-mill" timber sale to an "ecosystem management project"—even though the proposal was unchanged from the original.

In the draft EIS, the Forest Service attempted to justify calling the sale an "ecosystem management project" on forest hearth grounds. The agency claimed that nearly 60 percent of the proposed logging volume on the sale would be to salvage trees with root rot.

When a University of Idaho forest pathologist examined the sale, however, he found virtually no root disease and concluded that the proposed clearcutting, burning, and replanting with non-native white pine would cause significant damage to the ecosystem.

No final decision has been made by the Forest Service, though the final EIS and Record of Decision are expected soon.

SISKIYOU NATIONAL FOREST "UPPER CHETCO MEADOW RESTORATION PROJECT"

In the late 1980s, the Chetco Ranger District on the Siskiyou National Forest in southern Oregon planned to clearcut a large tract of roadless area containing northern spotted owl habitat in order to log 2.2-million board feet. When a court injunction halted this and other sales in owl habitat until the Forest Service implemented a legal forest plan, the sale was deferred.

It reappeared in late 1993, however, slightly reconfigured but significantly repackaged: it was now called a "meadow restoration project" instead of a clearcut timber sale.

According to press reports, a ranger district official said the proposal, which would clearcut 72 acres and remove 1.8-million board feet of trees."

[It's] a meadow enlargement project. It's not a timber sale. While we are going to sell some timber from it, that's not its purpose.

The fact that this proposed clearcut lies inside one of the Late Successional Old Growth Reserves designated in the draft old-growth forest plan that will be finalized today means that it will almost certainly be cancelled. The President's plan bars clearcutting in the Reserves.

Nonetheless, it is shocking that the Forest Service would even consider packaging a clearcut as "meadow restoration" in a roadless area slated to be off-limits under the pending forest plan. It's a ruse by any other name.

ANACOSTIA RIVER BASIN

President Clinton's proposed budget for fiscal year 1995 includes funding for an ecosystem management initiative, which is an outgrowth of the National Performance Review. One of the four ecosystems targeted to receive funding through this initiative is the Anacostia River watershed in Maryland and the District of Columbia.

The President's budget documents describe the Anacostia as a "forgotten river":

The river flows through some of the most densely populated and economically depressed areas of the Nation's Capitol. Once covered with forests and wetlands, the watershed is now highly urbanized, the natural riverflow has been altered, and the river is best known for its extremely poor water quality . . . As a result, the Anacostia has been rated among the Nation's 10 most-threatened rivers.

Contributing to the Anacostia's problems are a series of environmentally damaging developments, including a power plant, combined sewer overflows, a municipal incinerator, and numerous hazardous waste hot spots.

The Federal Government's proposal to spend \$2.3 million in fiscal year 1995 to assist the State of Maryland and the District of Columbia in the Anacostia restoration effort deserves great praise not just because of the commitment it shows to urban ecosystems, but also because it is a step toward implementation of the President's Executive Order No. 12898 on environmental justice.

Nonetheless, there are significant roadblocks standing in the way of the Anacostia Ecosystem Restoration Initiative. For example, two Federal agencies, the National Park Service and the Federal Highway Administration, are supporting proposals to pave over or develop for private profit more than 60 acres of Federal park woodland and green space near largely African-American neighborhoods on the banks of the river.

Those proposals run directly counter to the President's ecosystem management initiative and would severely undermine his efforts to restore the ecological integrity of the Anacostia watershed.

MONTE VISTA NATIONAL WILDLIFE REFUGE

In 1993, the Fish and Wildlife Service issued a "Draft Environmental Assessment and Compatibility Determination" for the Monte Vista National Wildlife Refuge, in Colorado. The document was intended to assess "habitat management tools" and the "compatibility . . . of grazing as a management tool" on the Refuge.

While the FWS proposal to use grazing as a management tool was not directly linked to the President's 1993 "ecosystem management" initiative, the Draft EA, and a draft response to public comments on the Draft EA, emphasized the Refuge's role in protecting and maintaining biodiversity.

One commenter on the Draft EA, Dr. David Anderson, of the Colorado Cooperative Fish & Wildlife Unit, argued that the presence of cows, sheep and goats on a NWR is diametrically opposed to biodiversity."

The final version of the Service's response to this and other public comments has not been prepared. In the draft response, however, regional FWS officials replied as follows:

We feel that livestock supports biodiversity since these animals are a part of a biotic community, not separate from it. As food for thought, would the extinction of livestock be any less devastating than the extinction of whooping cranes?"

Even ignoring the inappropriateness of the "food for thought" pun, it is hard to imagine a characterization of biodiversity that would be further off the mark. Studies on the Monte Vista Refuge have proven that livestock grazing on the Refuge has caused a substantial decline in both nest density and nest success for ducks.

Moreover, it is not only duck populations on the Refuge that are affected by grazing. Other game and non-game ground nesting birds are also adversely impacted, and the FWS compatibility determination even concludes that grazing will reduce average use by cranes during spring and fall migration.

In light of these data, the ability of the Refuge to fulfill its fundamental purpose—"to conserve and protect migratory birds . . . and other species of wildlife found thereon . . ."—is questionable. It certainly stretches credulity to argue that it promotes biodiversity to introduce non-native species that adversely affect native populations.

OLD-GROWTH FOREST ECOSYSTEMS

The President's plan for managing old-growth ecosystems in the Pacific Northwest and northern California, which is scheduled to be given to U.S. District Judge William Dwyer today, is hailed by the administration as the best ecosystem management plan ever produced.

While we agree that the administration has placed a greater emphasis on ecosystems in the most recent versions of this old-growth forest plan than in any of its prior attempts, all of which were found to be illegal, we are not prepared to declare it a success. First, we have not had an opportunity, nor has anyone as of yet, to review the final version of the plan.

Second, the Forest Service and Bureau of Land Management acknowledge that "there is less than complete information about many of the relationships and conditions" that influenced the development of the plan. In addition, "the precise relationships between the amount of habitat and the future populations of species are far from certain; there is a certain level of risk inherent in the management of forest lands even to standards based on conservative application of those relationships."

Those risks are underscored by the most recent study of northern spotted owl populations, which found that populations of adult female owls are declining at a much faster rate than previously believed, that the rate of decline is accelerating, and that their odds of survival have fallen significantly in recent years. The obvious conclusion is that the plan (at least in its draft form) may not protect enough of the remaining old-growth ecosystem from the chainsaw to guarantee that the spotted owl will survive.

When informed that the Forest plan would leave up to one-fourth of the remaining old-growth forest in the Northwest open to logging, the authors of the owl population study wrote that:

If this statement is true, then this must certainly be against any rational interpretation of the results of the December workshops [that produced their study]. We are somewhat stunned by this issue and must hope that [the] figures here (one-quarter) are mistaken.

Finally, how ever much habitat the final forest plan protects for the owl, the salmon, and other plants, animals, and fish that depend on old-growth ecosystems, it will be years, if not decades, before anyone can say that this plan is a successful example of ecosystem management.

CONCLUSION

Ecosystem protection, and restoration of degraded ecosystems, ought to be among the most important issues on the national agenda today. Each of our lives—from the food we eat to the water we drink—depends on healthy, functioning ecosystems. As history has shown repeatedly, when ecosystems collapse so do human civilizations. We are no different from our ancestors in that regard.

To the extent that government initiatives and commitments to adopt ecosystem-based management of our natural resources truly emphasize the ecosystem and not the management, we will have made progress. If, on the other hand, ecosystem management is simply a euphemism for business-as-usual, then we will have learned nothing from the lessons of history and are likely doomed to repeat our ancestors' mistakes.

The Legal Defense Fund applauds this committee's examination of ecosystem issues and is willing to contribute to that effort in any way we can.

World Wildlife Fund

On behalf of its 1.2 million members, World Wildlife Fund (WWF) appreciates the opportunity to submit testimony for the record on cooperative efforts by Federal agencies, State, and private entities to implement ecosystem management principles to protect our Nation's biological diversity.

The primary mission of WWF is to maintain biological diversity, at the regional, national, and global level. We are encouraged by the administration's movement towards integrating ecosystem management approaches into its natural resource policies. The following statement will focus primarily on the President's Pacific Northwest Forest Plan and Federal agency efforts to integrate ecosystem management principles into their timber management practices. In addition to the President's Pacific Northwest Forest Plan, there are several important examples of cooperative agreements in the Pacific Northwest region (and nationally) that also deserve recognition and are briefly mentioned here.

ECOSYSTEM MANAGEMENT

Because ecosystems cross jurisdictional boundaries, they provide an ideal opportunity to build cooperative interagency programs and processes. Since ecosystem management includes humans as part of the system, such approaches must promote sustainable resource development activities while minimizing ecological degradation. Through the development of comprehensive management schemes, ecosystem management recognizes that preserving the biological diversity of a region at a stable level is vastly more simple and cost-effective than trying to recreate or restore it.

From our monitoring of Option 9 we perceive a widespread lack of understanding on what constitutes biodiversity, how an ecosystem works, and the fundamental principles of an effective ecosystem management strategy. Within the context of the President's Pacific Northwest Forest Plan, several misconceptions need to be dispelled if the Forest Service is to implement a sustainable ecosystem management plan for the Region.

An ecosystem is comprised of biological (e.g., plants, animals, fungi, bacteria) and physical (e.g., air, temperature, water, elevation) elements that interact over time and space to form interdependent communities that are self-maintaining and self-perpetuating in the absence of catastrophic disturbances. What constitutes a "catastrophic event" depends greatly on the environmental conditions present in an ecosystem. For example, fire in a healthy old-growth forest is a natural disturbance that furthers successional processes and maintains ecological functions. However, fire in protected reserves that are isolated from other old-growth forest may be catastrophic if the affected area is not sufficiently large enough to maintain natural ecological processes and there are no accessible source pools of species or dispersal habitats nearby to facilitate the regenerative processes. In contrast, clear-cutting an old-growth forest is akin to a catastrophic disturbance that irreparably alters critical ecosystem processes by destroying soil layers, removing sequestered nutrients and minerals, and simplifying species composition and forest structure.

One problem WWF has noted is the lack of discussion on the basic tenets of ecosystem-based management. The principles of ecosystem management critical to a sustainable management plan include:

- Reliance on scientifically-driven analyses and principles of conservation biology.
- Recognizing that humans and human activities are part of ecosystems, but that such activities must sustain important ecosystem processes.
- Identifying proper management units that are based on natural boundaries, not political or jurisdictional lines.
- Maintaining biological diversity over short-term economic development; acknowledging that ecological and economic sustainability are closely linked.

- Providing for continued research and monitoring of a plan's impact to ensure it is meeting its goals for sustaining ecological processes and to verify the proper management scale was chosen.
- Restoration of degraded ecosystems.
- Establishing management units and/or reserves which emphasize ecological processes and functions over the physical characteristics of a system.
- Designing reserve systems to ensure that the full range of biological communities are represented.
- Understanding what systemic limits exist for management actions to avoid reaching the "point of no return" in an ecosystem.

It is relatively simple to make a stand of trees look like an old-growth forest, but it is infinitely more difficult to make a stand of trees function as an old-growth forest. An old-growth forest provides shelter and food for species at every level of the food chain, ranging from fungi which require narrowly defined microclimatic conditions to marbled murrelets, which show a strong preference for unfragmented blocks of pristine forest for their nesting. Old-growth forests used by these species sustain highly complex ecological processes such as nutrient cycling, forest decompensation, and predation and parasitism webs. The rates at which these processes occur can not be recreated through timber stand management. Many of the elements specific to old-growth ecosystems, which have developed over several hundreds of years, can only be regained if sufficiently large adjacent blocks of old-growth forest are left intact. Even if we possessed the scientific knowledge and tools necessary to recreate an old-growth forest, it would take another several hundred years to restore degraded ecological processes, and the characteristic, and often unique, biodiversity that is now found in these forest remanents.

Forest ecosystems have different successional stages; the late-successional stage represents a complex system of interdependent species and ecological processes that cannot be recreated from clear cuts. For example, the remaining 13 percent of late-successional old-growth forests in the Pacific Northwest act as source pools of species that perform vital ecological functions for forest regeneration in adjacent logged or naturally disturbed areas. Without these source pools, forest regenerative and restorative processes would be seriously compromised, and, ultimately forest productivity (e.g., timber production) becomes unsustainable.

For instance, when an old-growth forest is cut, the soil is damaged and the top layers are washed away, resulting in the loss of beneficial fungi and invertebrates that perform critical nutrient cycling and decompensation functions, and irreparably damaging salmon spawning beds. The ability to restore old-growth conditions in degraded forest systems depends on a combination of environmental factors, including the slope, soil depth and composition, elevation, and physiography of the logged area.

Because many areas in the Pacific Northwest lack ideal conditions for forest restoration, the expected goals advanced by the President's Pacific Northwest Forest Plan for restoring and recreating old-growth systems are simply unrealistic. Implementing timber practices which assume we can manage a forest stand for old-growth characteristics while allowing the continued cutting of undisturbed old growth is not sustainable ecosystem management. It presumes a level of understanding of ecological processes that neither the Forest Service nor the scientific community has yet attained. What we do know is that large blocks of inviolate reserves of old-growth forests *do provide* the opportunity for regeneration and restoration of adjacent areas and *do provide* critical habitat for a multitude of species. These forest also provide benefits for the public, including protection against erosion and flooding, potential medicines and food sources from regional plants and animals, clean water in streams and rivers, recreation, and nontimber economic opportunities.

The remaining blocks of original pristine forests in the Pacific Northwest are the only areas likely to sustain old-growth forest processes and community assemblages (discrete interdependent associations of species). These areas should form the backbone of a protected areas network which can act as source pools for colonization by species into regenerating forests. Additionally, such networks should represent the administration's blueprint for the ecosystem restoration component of its overall ecosystem-based management efforts.

ECOSYSTEM MANAGEMENT IN THE PRESIDENT'S PACIFIC NORTHWEST FOREST PLAN

WWF is encouraged by the administration's commitment of moving forest policy toward a broader based ecosystem management approach by seeking to adopt a forest plan that, according to the President, is "scientifically sound, ecologically credi-

ble, and legally responsible." Option 9 was a good first attempt to establish a system of reserves to protect remaining habitat of old growth associated species within the range of the northern spotted owl. However, we are concerned that several critical biological issues affecting the scientific credibility of Option 9 for ecosystem management in the Pacific Northwest have not been adequately addressed.

A major flaw of Option 9 is its underlying assumption that old-growth characteristics can be recreated across the landscape through existing forest management techniques. Reliance on this assumption encourages continued cutting of remaining old-growth blocks. WWF is especially concerned that this strategy emphasizes the structural characteristics of old growth at the expense of function and ecological processes. For instance, most of the late-successional reserves designated for inclusion in the President's Forest Plan do not have old-growth characteristics or habitat, but are expected to be managed to attain the necessary attributes over time. Consequently, approximately 60 percent of the reserves under Option 9 consist of previously managed timber stands, while a large portion of the remaining 42 percent of designated reserves are degraded and fragmented forests which do not support critical ecological processes.

The President's Pacific Northwest Forest Plan does not go far enough in protecting original blocks of old-growth habitat; instead it subjects up to 22 percent of the remaining old-growth forests to timber logging. Allowing this level logging may threaten up to one quarter (25 percent) of 1,700 identified late-successional dependent species with extinction. Such an outcome is inconsistent with the President's mandate that the Forest Plan be based solidly on science and adhere to the appropriate environmental statutes, including the National Forest Management Act of 1976 (16 U.S.C. § 1600 *et seq.*) and the Endangered Species Act (16 U.S.C. § 1531 *et seq.* (1988)).

The Forest Service, along with other Federal resource agencies, has evinced a serious commitment towards developing and integrating ecosystem management approaches into its forest policy. WWF supports this effort, but is concerned that scientifically-sound principles of ecosystem management are still being impacted by commodity production pressures. Our recommendations on Option 9 and the President's Pacific Northwest Forest Plan have focused on the need to give management plans, which maintain species and ecological processes dependent on old-growth forests, a higher priority than plans which emphasize extractive commodity production.

WWF has made numerous recommendations for improving Federal ecosystem management of the Pacific Northwest Forests and have attached our comments to this testimony. In light of the scientific and social controversy engendered by Option 9 which remains unresolved, we urge the Forest Service and Congress to reassess the decisions made pursuant to the President's Pacific Northwest Forest Plan with respect to both Option 9 and the Interior Columbia Basin Ecosystem Management Plan¹⁰ now being developed. Of special concern to WWF is the designation of a reserve system under Option 9 that is in insufficient to support a number of species found within the range of the northern spotted owl. It is critical that the Forest Service address the need to set aside larger linked blocks of remaining old-growth habitat as inviolate core reserves to maintain viable populations of species, sustain ecological processes, and provide adequate margins of safety for short-term and long-term environmental disturbances if its ecosystem-based management approach is to be successful.

THE INTERIOR COLUMBIA BASIN ECOSYSTEM MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT AND SCIENTIFIC ASSESSMENT

Building on the President's Forest Plan's recognition that ecosystem management is necessary for sustainable forest practices, the Interior Columbia Basin Ecosystem 59 Fed. Reg. 4680 (February 1, 1994) Management Environmental Impact Statement and Scientific Assessment (Eastside Scientific Assessment) provides the Forest Service and Bureau of Land Management with an opportunity to remedy many of the inadequacies remaining in Option 9, particularly since there is considerable overlap between the two regions.

The scoping process for the Eastside Scientific Assessment and EIS opened on February 1, 1994. In our comments to the Forest Service, we urged the Agency to incorporate a landscape scale appropriate to the conditions of the Interior Columbia Basin that is based on principles of conservation biology. We are concerned that, absent an integrated ecosystem management approach, this region will experience a continued decline in biological community assemblages from existing and proposed timber management practices. We urge the Eastside Team to emphasize restoration

¹⁰ 59 Fed. Reg. 4680 (February 1, 1994).

of important ecosystem processes and community assemblages over extractive commodity production as a key component of the Eastside Forest Management Plan. Without a comprehensive strategy that focuses on restoring the ecological functions of impaired ecosystems, timber production in the Region will be unsustainable and result in long-term economic and environmental costs.

It is critical that the Forest Service and Bureau of Land Management address the following issues if the Eastside Forest Management Plan is to adequately implement measures that ensure the Region's biological diversity is protected in a sustainable manner. The principles of ecosystem management, listed on pages 3-4, dictate that the following scientifically-based recommendations be incorporated in the Eastside Forest Management Plan:

- Viable populations of species from all represented taxonomic groups must be protected by the placement of reserves and the types of timber, restoration, and management practices implemented by Federal agencies.
- A reserve system is established that provides a sufficiently large land base to allow ecological functions and processes to continue in both the short term and long term.
- Reserves and buffer zones retain characteristics which enable them to act as safety margins for dependent species from natural disturbances (e.g., fire, pests, drought) and management activities in nearby or adjacent logged areas.
- Restoration and maintenance of critical habitat types (e.g., late-successional forests, low-elevation forests) should be undertaken at the watershed and regional level using information on natural disturbance regimes and habitat distributions to mimic historical conditions as closely as possible.

The Eastside Scientific Assessment provides an additional opportunity for agencies to reevaluate their traditional fire management practices which have altered the composition of forest communities. The dry provinces, found east of the Cascades mountain range, offer the Federal resource agencies the chance to engage in cooperative projects to apply prescribed fire-management techniques. These projects would reintroduce the role fire plays in directing forest-succession processes and accelerate the restoration of degraded areas historically populated by fire-tolerant species.

OTHER EXAMPLES OF COOPERATION IN ECOSYSTEM MANAGEMENT

Multiagency Memorandum of Understanding for Pre-listing Agreements. In January 1994, the Forest Service, the Bureau of Land Management, the National Park Service, the Fish & Wildlife Service, and the National Marine Fisheries Service signed a National Memorandum of Understanding (MOU) on the Imperiled Species Conservation Initiative which establishes a cooperative framework for the participating agencies to conserve species that are on the brink of being listed under the Endangered Species Act.¹¹ Recovery plans for endangered and threatened species are costly and labor-intensive. This MOU seeks to proactively address the threats sensitive, candidate, and proposed species are facing within their habitats before their numbers and viability reach a crisis point. The National MOU encourages the agencies' regional and district offices to develop joint conservation plans for species to avoid listing under the Endangered Species Act. The Forest Service and Fish & Wildlife Service have already initiated a conservation agreement for the Cow Knob Salamander (*plethodon punctatus*) in Virginia and West Virginia.¹² Implementing the National MOU, which facilitates development of regional interagency conservation plans, can save taxpayers millions of dollars while helping to integrate ecosystem-oriented approaches into the resource management activities of these Federal agencies.

WWF supports the use of innovative, prelisting agreements as set forth in the multiagency National MOU. To ensure this process is effectively implemented, adequate funds should be allocated to the individual agencies to enable the development of scientifically-based programs that have specific recovery objectives and pro-

¹¹ U.S.C. § 1533.

¹² *Conservation Agreement for the Cow Knob Salamander*, U.S. Forest Service and U.S. Fish & Wildlife Service, Jan. 25, 1994. Other examples include the MOU on the *Idaho Conservation Effort for Candidate, Threatened and Sensitive Species*, Jan. 19, 1994 and the MOU on the *Utah Conservation Effort for Sensitive, Candidate, and Listed Species*, Feb. 17, 1994. One or more of the regional offices of the Forest Service, the Fish & Wildlife Service, and the Bureau of Land Management, as well as State resource agencies, are participating in both MOUs.

vide for adequate research and monitoring of recovery plans. The interagency agreement has numerous applications for species, such as those in the Pacific Northwest, which require an inter-regional, and/or ecosystem approach to effectively conserve their habitats.

Forest Service Reinvention WWF. WWF is pleased by the Forest Service's bold initiative to examine its mission and organizational structure as part of the President's commitment to reinventing government. As part of its reinvention process, the Forest Service must continue to emphasize ecosystem management considerations over commodity production and work to develop scientifically-based standards for achieving ecosystem restoration and sustainability. To enable the Agency to make this paradigm shift and in its efforts to manage ecosystems over individual species, legislative support to change the Forest Service's focus on sustained timber yield to sustainable ecosystems is critical.

Likewise, WWF supports efforts to employ displaced timber employees through the Forest Service (and Fish and Wildlife Service) "Jobs in the Woods" Program. It is important to recognize the need to develop alternative economies for regions suffering from overexploitation of resources and environmental degradation. The "Jobs in the Woods" Program serves a two-fold purpose: it offers opportunities for workers to generate income for their families and communities and it supplements agency activities for restoring degraded ecosystems (e.g., stream and watershed restoration projects which employ displaced workers).

Comprehensive Habitat Conservation Plans Non-Federal Lands. One of the greatest challenges facing endangered species is the need to manage private activities using sound conservation biology principles to prevent adversely affecting species or their habitats. Habitat Conservation Plans (HCPs), provided for in § 10 of the Endangered Species Act, can play an important role in meeting this challenge. HCPs can assume a variety of forms, ranging from single development projects to land use strategies encompassing many square miles. With the Fish & Wildlife Service as the lead agency, HCPs are often a final outcome of negotiations among land owners, local governments, developers, conservation groups, and natural resource agencies. A properly designed HCP, based on conservation biology principles, which includes analyses of alternative strategies, is a positive example of a cooperative effort to implement ecosystem management for a particular area.

There are several State HCPs which incorporate ecosystem management principles. WWF is currently reviewing an HCP being developed by the Washington State Department of Natural Resources (DNR). This comprehensive HCP seeks to conserve Federally-listed, proposed, and candidate species on 2 million acres of state-owned land. The plan is designed to assist in the recovery of declining species by integrating habitat conservation on State lands with Federal recovery plans.¹³ The Washington HCP has been structured to allow timber logging to occur outside the areas set aside for the protection of these species.

WWF supports the comprehensive approach employed in the Washington HCP because it:

- 1) is designed to contribute to Federal recovery plans for declining species;
- 2) adopts a proactive approach to maintaining and recovering proposed and candidate species, in addition to endangered species listed pursuant to § 4 of the Endangered Species Act; and
- 3) advances the concept and implementation of ecosystem management based on conservation science principles.

The HCP process developed by the Washington State DNR is a positive demonstration of how the Endangered Species Act can be used to bring a diverse array of land owners together to achieve a balance between sustainable timber management and conservation of declining species.

Ecosystem management holds the promise of moving science, conservation, and economic development closer to the goal of sustainable development. To accomplish this objective, the Federal resource agencies and all stakeholders have to commit to an iterative process that is based on science and works to integrate ecological, social, and political processes, not compartmentalize them. WWF is encouraged by the steps taken by the administration and Forest Service to implement an ecosystem-based forest plan for the Pacific Northwest. To this end, we support cooperative efforts, such as the Imperiled Species Conservation Initiative currently being

¹³ 16 U.S.C. § 1533(f) (1988) requires the Secretary of the Interior to create and implement recovery plans for species listed under § 4 of the Act.

implemented by Federal resources agencies, providing it is fundamentally based on the recovery of declining species, establishes specific recovery targets, and is adequately monitored.

However, we strongly urge the Forest Service and Congress to continue to develop Federal forest and environmental policies that actively support and implement ecosystem-based cooperative programs. It is crucial that Federal agencies recognize, in their planning and management activities, that ecosystem management principles are critical for long-term ecological sustainability. The Interior Columbia Basin Ecosystem Management EIS and Scientific Assessment offers the Government an ideal opportunity to take on this challenge. In real terms, this effort will lead to improved scientific knowledge of ecological processes and have long-term economic benefits for the Region and the Nation. A healthy, intact forest, watershed, or river basin provides a multitude of benefits for humans including the maintenance of biological diversity, nonwood forest products (e.g., mushrooms, floral greens), clean water and air, medicines, recreational opportunities, and commercial fisheries.

WWF looks forward to continuing its work with Congress and participating Federal agencies to improve our understanding and application of ecosystem management to fully achieve the goal of ecological sustainability.

RECOMMENDATIONS FOR IMPROVING THE BIOLOGICAL BASIS OF FEDERAL ECOSYSTEM MANAGEMENT OF THE PACIFIC NORTHWEST FOREST ECOSYSTEM

We are greatly concerned that several critical biological issues effecting the scientific credibility of Option 9 for ecosystem management in the Pacific Northwest have not been adequately addressed. From our monitoring of the development of Option 9 as the preferred Federal plan for ecosystem management, we perceive a widespread and profound lack of understanding of what biodiversity is, why it is important, how ecosystems work, and the principle objectives of an effective ecosystem management strategy. As conservation biologists who have years of field experience in the Region and a thorough knowledge of its natural history and ecosystem dynamics, we felt it important to try to clarify and bring to the forefront of the debate those issues that are fundamental to the long-term viability of the ecosystem and maintenance of regional biodiversity. Throughout this letter we propose a series of modifications to Option 9 that will enhance its efficacy for maintaining the ecosystem. Our recommendations are designed to strengthen Option 9 so that it is scientifically credible and legally defensible and therefore, more consistent with the President's mandate.

FUNDAMENTAL OBJECTIVES

The fundamental objectives of an ecosystem management strategy are to:

- Ensure that all native ecosystem types, and the full range of their variation, are adequately represented within a system of protected areas.
- Maintain viable populations of species through the conservation of well-connected large blocks of original habitat.
- Sustain ecological processes such as disturbance regimes, predation, decomposition, and nutrient cycling that are necessary to maintain viable populations and representative communities and ecosystems. Design and manage the ecosystem management strategy to incorporate adequate margins of safety for short-term and long-term environmental disturbances and change.

CLEARING THE BIODIVERSITY

Fog Old-growth Forests and their Closely-Associated Species are Threatened with Extinction, Early-Successional Species are Not Threatened

We are concerned that a number of biologically incredulous arguments have recently been presented at Congressional hearings concerning biodiversity. In particular, there is a misconception that a cessation in logging will cause a loss of biodiversity by eliminating habitat for early-successional species. This argument is fallacious, at best. Even in pristine ecosystems, forest disturbances from fires, wind storms, floods, and insect and disease outbreaks are frequent and extensive enough to maintain an adequate amount of early-successional habitat to allow dependent species to persist. Moreover, the reduction or cessation of all commercial logging will have little impact even on the population sizes of early successional specialists be-

cause of the prevalence of disturbed habitat in the extensively altered landscape. Clearly, species associated with early-successional habitats are not threatened by extinction from habitat loss or fragmentation stemming from commercial logging of old-growth forests. The species that are currently threatened and endangered are the ones that are narrowly specialized on the conditions and resources found in old-growth forests, and are therefore most sensitive to forest disturbance and habitat loss. Less than 13 percent of the original old-growth forest is left, and the remaining patches are often small, highly fragmented, and isolated from other patches. Therefore, the focus of biodiversity concerns are the suite of old growth associated species, including the northern spotted owl, marbled murrelet, and numerous lichens, salamanders, and invertebrates. Grouse, deer, and other species that benefit from early-successional habitats can effectively utilize a wider range of habitats than old-growth specialists. Conversely, many old-growth species that rely on moist forest understory habitats will not even cross a logging road due to its dryness.

Species Diversity is Indisputably Highest in Old-Growth Forests

Another commonly used, but inaccurate, argument is that species diversity is maximized in areas that are logged. Clearly, a landscape that has a wide variety of habitat types will support more species, but again, pristine forests typically maintain a sufficient mosaic of habitat types to permit a broad assemblage of species to coexist over the landscape. This deceptive diversity argument really reflects a problem of scale and technique in survey work. Much of the data used to justify this pattern is from counts of larger vertebrates such as birds conducted in very local areas. Forest-edge habitats created by logging are often highlighted because, at the level of a single locality and survey period, edges typically have high diversity because of an overlap of forest and open-area species. If these surveys were conducted at an ecologically sensible scale, such as at the scale of watersheds or other landscape-scale features and over several months or years, and included plants and invertebrates which comprise the bulk of biodiversity, they would easily find that old-growth forests are significantly more diverse and complex than early successional or edge habitats.

All Late-Successional Forests are Not Old-Growth Forests and Old-Growth Forests Cannot be Recreated through Management

One of the most dangerous misconceptions for ecosystem management is the notion that all late-successional forests (*i.e.*, defined by the presence of large trees according to the Forest Service) are biologically equivalent to old-growth forests. They clearly are not, but this pretense leads to the myth that humans can restore old-growth ecosystems simply by letting clear cuts grow back and "managing" for old-growth characteristics. The species assemblages, structural complexity, and ecological interactions of old-growth forests (*i.e.*, forests that are essentially undisturbed from presettlement times) have taken millennia to form. Forests with many of the characteristics of true old growth can only be reestablished if there is an adjacent block of undisturbed old-growth forest that can act as a source for species and unaltered ecological interactions associated with old-growth ecosystems. Larger blocks of original habitat will provide a source for a greater diversity of old-growth species and ecological processes due to minimum area requirements for their persistence. Because a number of species have very restricted geographic ranges, such as salamanders, land snails, and other invertebrates in the Klamath-Siskiyou Region and coastal forests, many species will go extinct if large blocks of old-growth habitat are not left appropriately distributed over the landscape.

SPECIFIC PROBLEMS WITH OPTION 9

World Wildlife Fund's comments on the EIS for Option 9 were both extensive and detailed. The most important points are summarized here.

Design of the Protected Area System

We are concerned that Option 9 is based on a poorly-defined process used to designate the location and amount of late-successional forests within the various management categories, and, as such, we are unconvinced that the preferred alternative will result in a significant improvement from the past inadequate forest policy. Given the uncertainties in modelling long-term impacts of timber harvest and recovery rates for degraded ecosystems, and the lack of examples where managed forests have developed late-successional characteristics over time, it is absolutely crucial that the preferred alternative protect all remaining intact and low-elevation, late-successional and old-growth forests from further degradation.

The placement of late-successional reserves under Option 9 is inadequate to achieve ecosystem representation, maintain viable populations, and promote the persistence of ecological processes. In many cases, large blocks of original habitat, including whole watersheds, which for many reasons are invaluable for the conservation of biodiversity and are now quite rare, are left outside of designated reserves (e.g., Dillon Creek in the Klamath Region). Many of the designated reserve boundaries encompass little old growth, and the patches that are included are often highly fragmented and restricted to patches too small to support viable ecosystem processes or species populations. If enough large blocks of habitat are present within a proposed reserve to act as a source pool for old-growth species and processes, it will take several centuries before characteristic old-growth habitats return to disturbed areas. The reserves proposed in Option 9 do not appear to have been delineated on the basis of the probability of a successful transition to mature native ecosystems. Moreover, critical large blocks of endangered habitat types, such as lowland and bottomland forest, have not been included within reserves. It is probably no coincidence that these habitats typically contain large trees optimal for timber harvesting.

It is essential that large blocks of original habitat form the core of the protected area system because they offer the best chance to achieve the fundamental objectives of ecosystem management. The FEMAT scientific team must be reconvened to provide a scientifically-based spatial analysis of reserves and harvest areas that is designed to (1) protect all remaining large blocks of old-growth forest, (2) minimize fragmentation of remaining low-elevation and contiguous late-successional forests, and (3) maximize linkages between habitat blocks. The FEMAT team should identify all areas of high species richness and endemism within the Region. This analysis should be set up using a tiered analysis for ranking areas focusing first on the persistence value of habitat blocks based on landscape parameters of habitat size, shape, location (e.g., intact watersheds), degree of fragmentation, and linkages to other habitat blocks, and second, on the location of biologically valuable habitats such as areas of high endemism or richness or currently rare habitat types such as low-elevation forests. To proceed with plans for ecosystem management without such an analysis is not scientifically sound or ecologically credible as mandated by the President.

Option 9 Further Threatens Areas of National and Global Significance for Biodiversity

Several areas within the range of the northern spotted owl characteristically support very diverse communities and many species with very restricted geographic ranges (i.e., local endemics). These include the Klamath-Siskiyou Region and the coastal forests of Oregon and Washington. The Klamath-Siskiyou Region is the "Galapagos" of North America in terms of its biological value. The Region's unusual geographic and evolutionary history has made it the home of many plant, invertebrate, and vertebrate species found nowhere else in the world. The rare communities of this region are far more biologically diverse, unusual, and threatened than the more widespread communities found in Yellowstone and Yosemite. A proposal that deserves serious consideration is creation of a large National Park in the Region, perhaps funded in part by revenue from recreation (which today greatly surpasses Federal revenues from logging), that would encompass, expand, and link the existing wilderness areas. It would be a disaster for the conservation of biodiversity in the United States to permit further destruction of the forests in this region.

The Management Practices Promoted in Option 9 Have Not Been Shown to be Ecologically Sound

First and foremost, reserves must be inviolate. The conservation benefits from the thinning and salvage practices outlined for late-successional reserves in Option 9 are unproven and most likely detrimental to the long-term viability of the ecosystem. Our experience indicates that naturally regenerating forests (i.e., stands regenerating following low to moderate burns) often retain many of the structural characteristics of late-successional forests and thus may not require thinning to accelerate the development of these important characteristics. Therefore, we recommend that thinning in naturally regenerating stands be confined to a controlled experiment to investigate whether such activities will interfere with the inherent biodiversity or structure of these stands. The Option 9 management prescriptions for salvage of standing dead trees (i.e., snags) and downed logs (i.e., woody debris) within reserves are based on unproven assumptions regarding impacts to late-successional species dependent on these important ecological characteristics. The discussion of salvage impacts has focused primarily on larger vertebrates and over-

looks the impacts on more sensitive invertebrates, herpetofauna, and fungi, and the important ecosystem functions such as decomposition and nutrient cycling that are performed by these organisms. The responsible agencies need to conduct rapid, large-scale experiments investigating the effects of different management treatments and landscape parameters (e.g., size of forest blocks) using the natural experimental treatments available over the highly disturbed landscape. It is puzzling why such experiments have not been already proposed and conducted by the responsible agencies. This experimental design is very straightforward and analytically powerful.

Adaptive Management Area (AMAs) are Realistically Incompatible with Ecosystem Management

Option 9 identifies 10 AMAs that were strategically positioned near timber dependent communities most significantly impacted by reductions in the supply of timber on public lands. These management area would be subject to extreme pressure from economic and timber interests, even if the intent is to manage them using ecosystem management approaches as defined by regulatory agencies, interagency teams, and nongovernmental organizations. The AMAs lack standards and guidelines on how research objectives and harvest levels will be determined and what processes will be used to prevent further degradation of existing late-successional forests in these areas. As such, we recommend that AMAs be eliminated as an option for ecosystems management. If, however, AMAs are included in the preferred alternative we recommend that, at the very least, the following areas be eliminated on the basis of their high levels of species richness, endemism, biotic uniqueness, and already extensive habitat loss and fragmentation; (1) Applegate in Oregon, (2) Gooseneck in California, (3) Mayfork in California, (4) Northern Coast Range in Oregon, and (5) Olympic Peninsula in Washington. Sustainable extraction of non-timber forest products, non-consumptive alternative industries such as recreation, and habitat restoration should be focal activities for adaptive management programs.

Riparian Buffers Need to be Strengthened

Although we agree with the intent to provide buffers within which logging and road building are prohibited, the proposed buffer widths were arbitrarily determined and lack supporting documentation from the scientific literature. Riparian reserves based on 1/2 tree height (i.e., 50 ft) widths may not be sufficient to maintain the cool, moist conditions associated with microclimates that riparian species require. Species are suppressed or lost up to 600 ft from forest edges because of changes in temperature, moisture, and biotic interactions associated with forest edges. Moreover, blowdown risks extend to at least 2 tree heights from forest edges. Therefore, we recommend a minimum of a 600-ft-wide buffer on all stream categories, including intermittent streams, to compensate for tree loss along forest edges and to provide a narrow 300-ft-wide strip of suitable microclimate and interior forest conditions. Since most streamside areas are currently denuded, projected buffers should not be included in calculations of late-successional totals or available habitat for species of concern for several decades until restoration targets have been met.

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